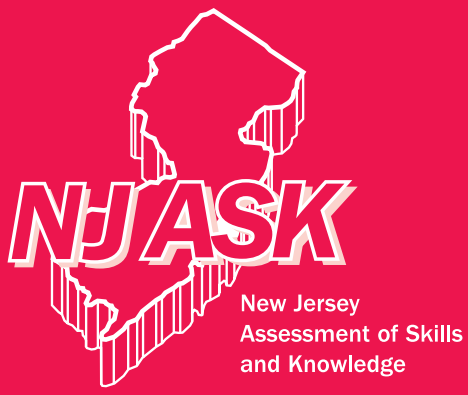

New Jersey Assessment of Skills and Knowledge

A Mathematics Manual

Open-Ended Questions

Grade 3 and Grade 4

Guide to Criterion-Based Holistic Scoring:

Mathematics

PTM #1506.44

New Jersey Assessment of Skills and Knowledge (NJ ASK)

Grade 3 and Grade 4

A MATHEMATICS MANUAL

OPEN-ENDED QUESTIONS

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November 2007
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TABLE OF CONTENTS

NJ ASK MATHEMATICS & OPEN-ENDED QUESTIONS

The mathematics section of the NJ ASK measures a student's ability to solve problems by applying mathematical concepts. The areas tested are: Number and Numerical Operations; Geometry and Measurement; Patterns and Algebra; and Data Analysis, Probability, and Discrete Mathematics.

The mathematics section of the test consists of multiple-choice and open-ended questions. Each open-ended question must be responded to in the area provided in the test. For each of these questions, a student must provide enough explanation so that the scorer can understand the solution. The student's response will be scored on the correctness of the method as well as the accuracy of the answer. Responses must be in English in order to be scored.

The open-ended questions will be hand scored on a scale from 0 to 3. The general scoring guide on the next page was created to help readers score open-ended questions consistently. The scoring guide is used by the trained readers who score the Mathematics open-ended questions on the NJ ASK test. Each question on the NJ ASK has its own scoring rubric which is based upon the general scoring guide.

The students are provided with a Mathematics Reference Sheet as shown on page 3. This sheet contains colored geometric shapes as well as a ruler, to aid the student in answering specific questions on the test. The student is also provided with a calculator during the calculator section of the test.

Scoring Guide for Mathematics Open-Ended (OE) Questions
(Generic Rubric)

3-Point Response

The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.

2-Point Response

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to make some inferences.

1-Point Response

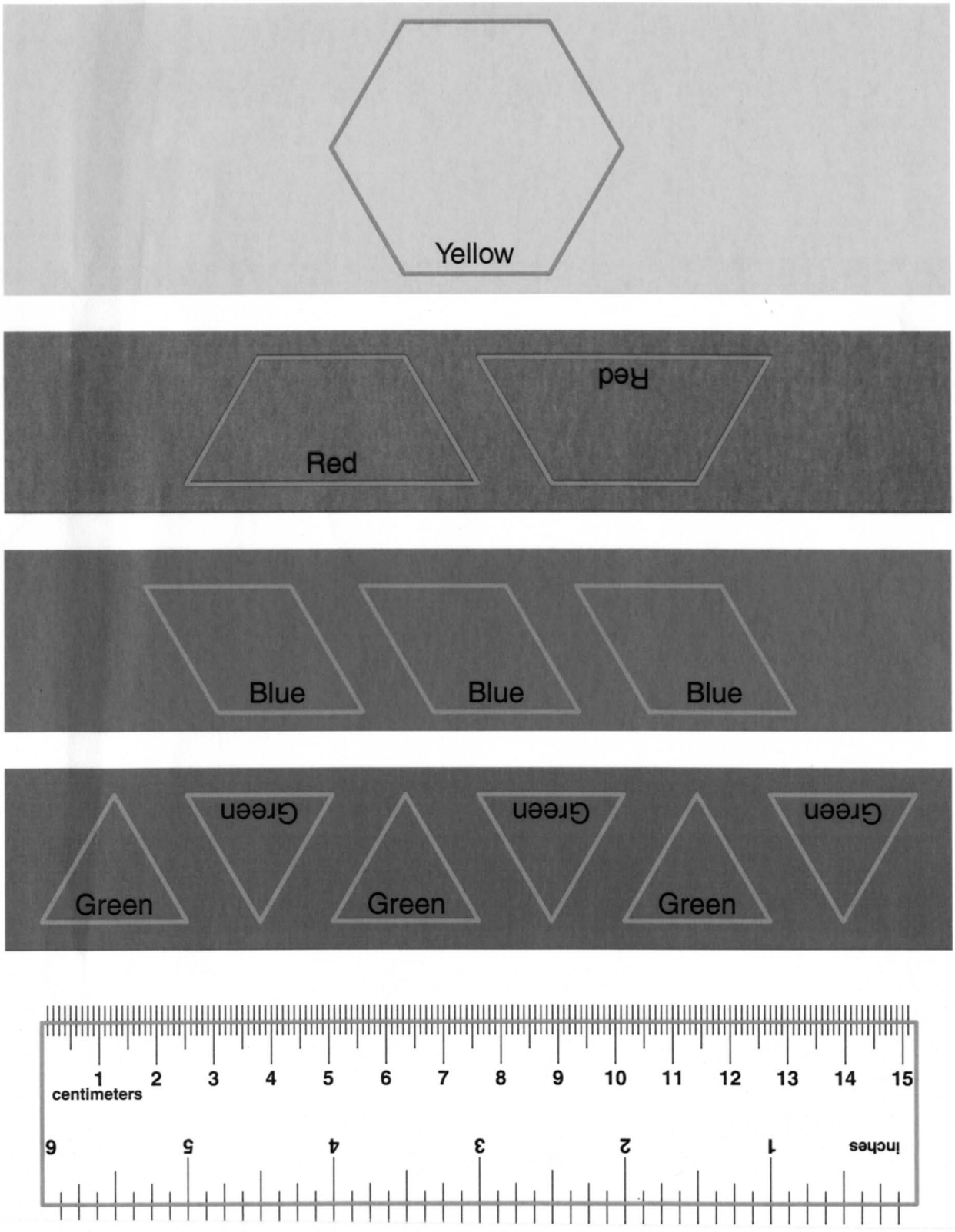
The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.

0-Point Response

The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.

The above generic rubric is used as a guide to develop specific scoring guides or rubrics for each of the open-ended (OE) questions that appear on the New Jersey statewide assessments in Mathematics. These scoring rubrics provide the criteria for evaluating and scoring student performance and are developed by a committee of mathematicians and teachers. Rubrics ensure that there is consistency, fairness, and accuracy in scoring open-ended questions.

Mathematics Reference Sheet



Note: Objects are not to scale.

DESCRIPTION OF THIS MANUAL

This manual is divided into two sections—one for Grade 3 and the other for Grade 4. Each section contains four open-ended items—one from each Standard. The question, sample solution, and item-specific scoring guide are provided for each item. Three exemplar papers for each score point are represented for each of the four open-ended items.

Samples are included for each score point of the General Scoring Guide for Mathematics (a 4-point scale, 0 to 3). These sample responses, which are grouped by score point, represent the range of approaches that third- and fourth-grade students take with this open-ended item in mathematics. Each response is annotated according to the score point criteria.

The responses selected to appear in this handbook were written by third- and fourth-grade students. The responses appear as the students wrote them; no corrections have been made other than the deletion of specific names that may have appeared to identify the student or the student's school district.

GRADE 3

OPEN-ENDED ITEMS

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question.

STANDARD 1 – NUMBER AND NUMERICAL OPERATIONS

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Sample Solution:

- No, 50¢-20¢ = 30¢
- A quarter and a nickel
- 3 dimes

Scoring Rubric

3 Points
The student

- shows/writes a correct reason why 20¢ is not enough
- shows one correct group of coins needed to make change
- shows a correct alternative group of coins to make change

2 Points
The student

- shows one correct group of coins needed to make change
- shows a correct alternative group of coins to make change

OR

- shows/writes a correct reason why 20¢ is not enough change
- shows one correct group of coins needed to make change

OR

- shows work to find an incorrect amount of change
- shows 2 correct combinations reflecting the incorrect amount of change

1 Point
The student

- shows/writes a correct reason why 20¢ is not enough change.

OR

- shows work to find an incorrect amount of change
- shows 1 correct combination reflecting the incorrect amount of change

OR

- states an incorrect amount of change
- shows 2 correct combinations reflecting the incorrect amount of change

OR

- response shows a limited understanding of the problem's mathematical concepts

0 Points
The student

- shows 2 combinations for the same amount of incorrect change

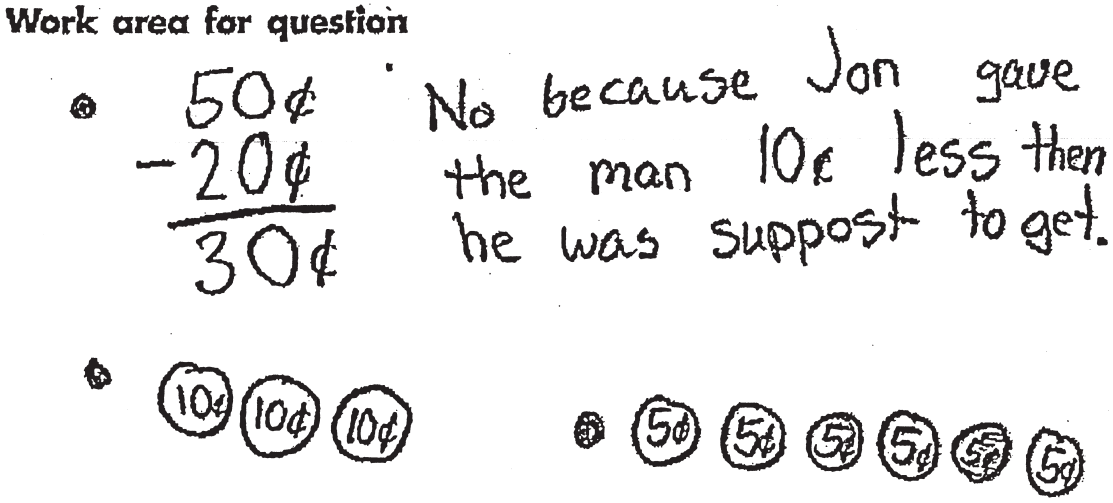
OR

- the response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



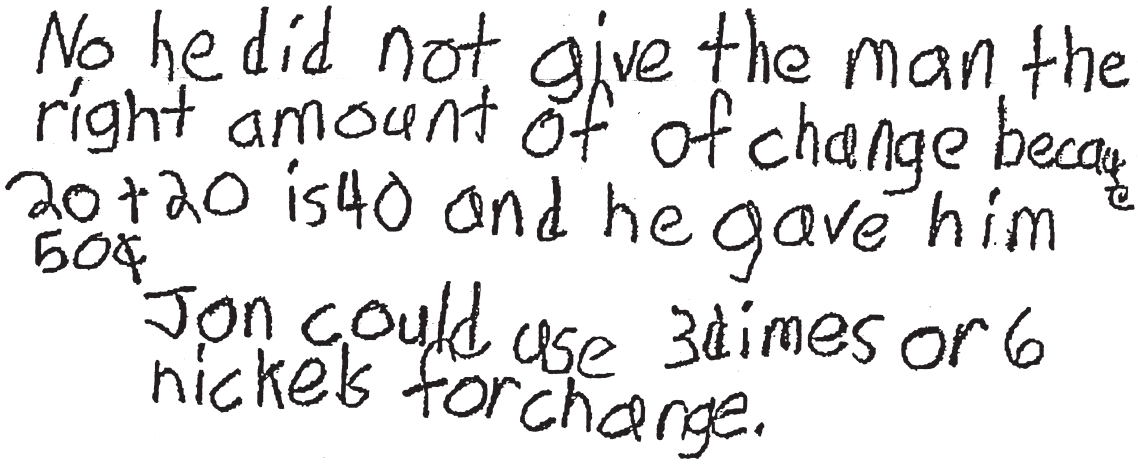
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly shows (*50¢-20¢=30¢*) or writes why 20 cents is not enough (*gave the man 10¢ less*). The student then shows two correct ways to make change.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



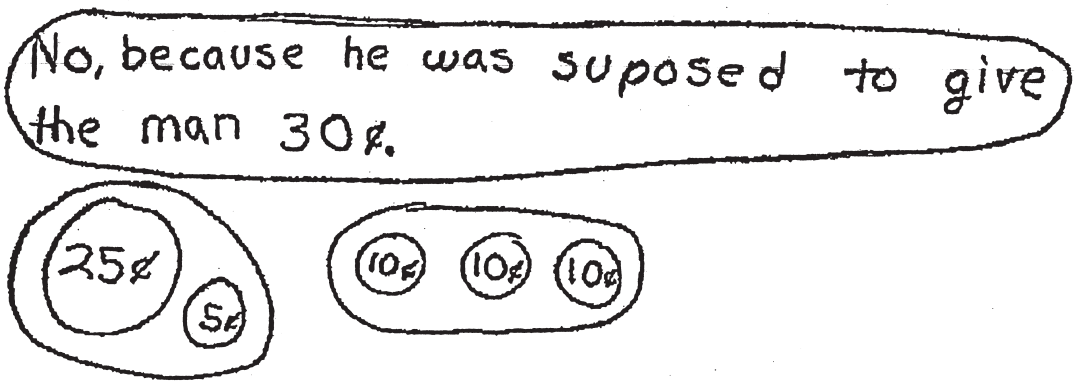
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly shows why 20 cents is not enough (*20 + 20 is 40 and he gave him 50¢*). The student then shows two correct ways to make change.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



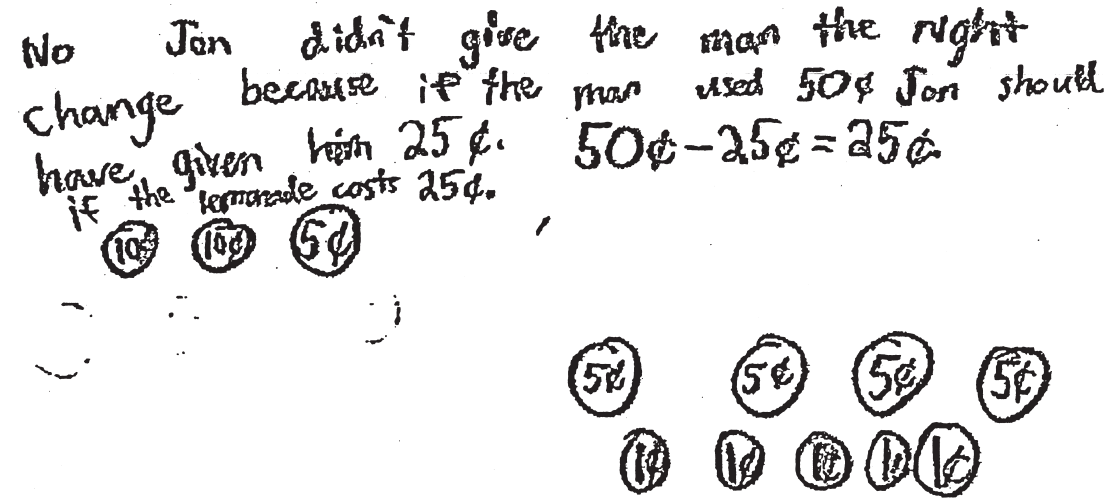
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes a correct answer as to why 20 cents is not enough (*he was suposed to give the man 30¢*). The student then shows two correct ways to make change.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- **Did Jon give the man the correct change? Show your work or explain your answer.**
- **Show one combination of coins that Jon could use to give the man the correct amount of change.**
- **Show another combination of coins that Jon could use to give the man the correct amount of change.**

Work area for question



Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student shows work to find an incorrect amount of change due to thinking that the cup of lemonade sold for 25¢ (*50¢-25¢=25¢ if the lemonade costs 25¢*). However, the work is correct and utilizes that answer (25¢) to show the two combinations of coins.

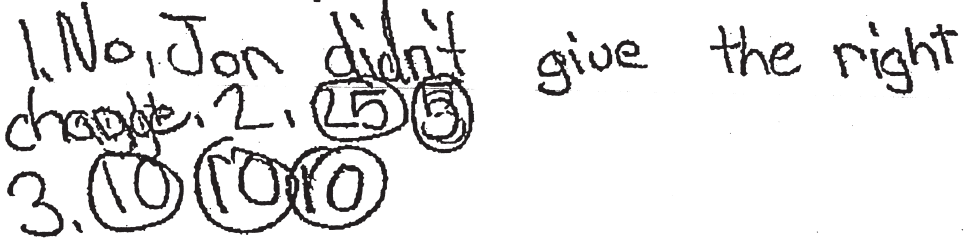
Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

1. Did Jon give the man the correct change? Show your work or explain your answer.

2. Show one combination of coins that Jon could use to give the man the correct amount of change.

3. Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes a correct response – "No, Jon didn't give the right change." However, the student does not go on to explain or show why. The student does give two combinations of coins to make the correct amount of change.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question

John didn't give correct change he gave the man 20 when he should of gave him 30 because

$$\begin{array}{r} 50 \\ -20 \\ \hline 30 \end{array}$$

More work area for question

There are two correct coin Cobinations for John to use

1 (25¢) [10¢] = 30¢

a quarter + a dime = 30¢

2 (5¢) (5¢) (5¢) (5¢) (5¢) (5¢) = 30¢

5¢ six times = 30¢

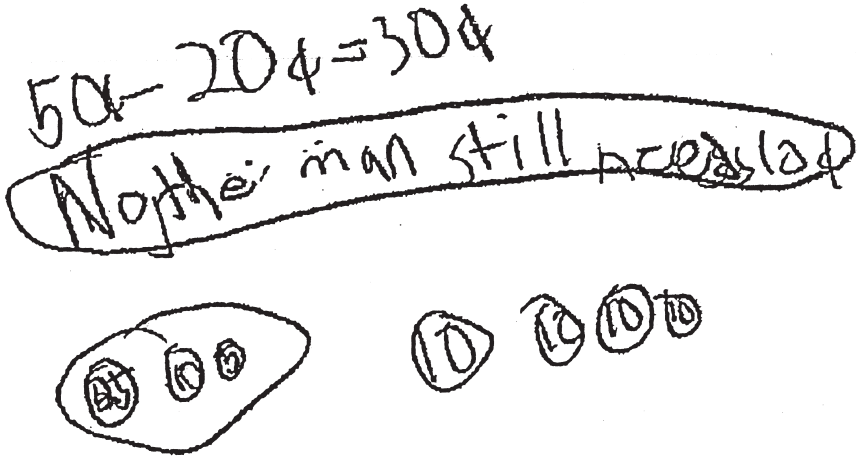
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student correctly shows (*50-20 = 30*) or writes why 20 cents is not enough (*gave the man 20 when he should of gave him 30*). The student then shows two ways to make change, one of which is incorrect.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



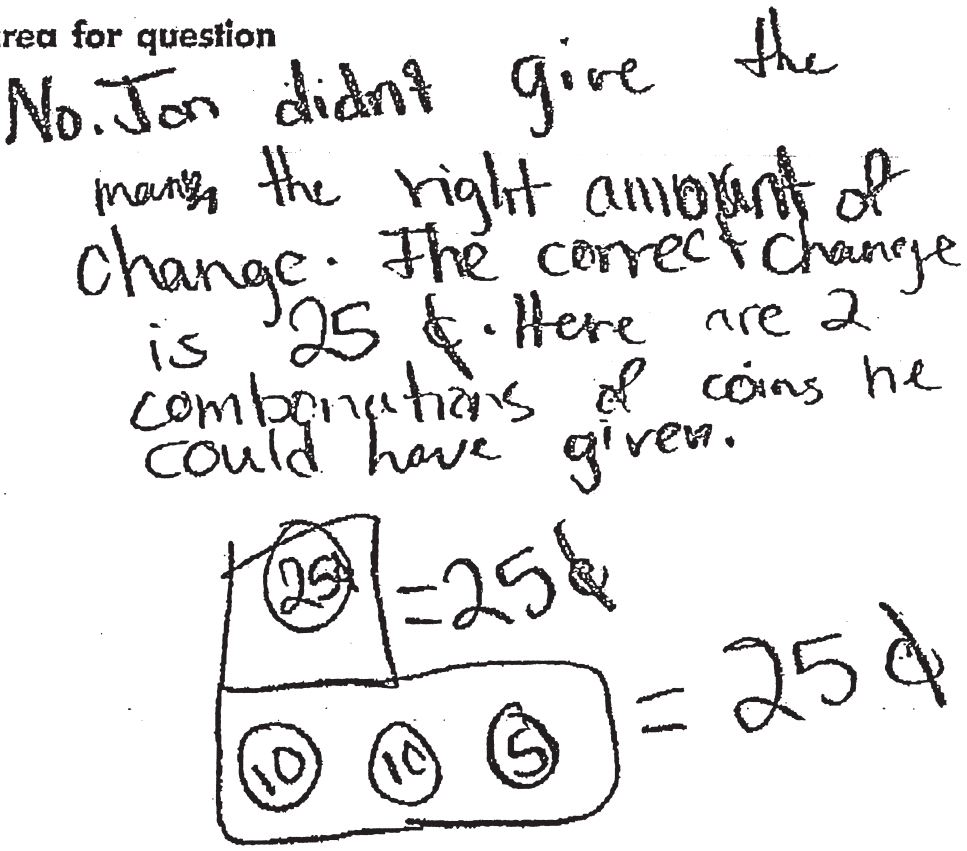
Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student shows a correct answer as to why 20 cents is not enough (*50¢-20¢=30¢*) or writes why 20 cents is not enough (*the man still needs 10¢*). The student shows two combinations of coins; however, neither represents the correct amount of change.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student writes an incorrect amount (*25¢*) without work and shows two combinations of coins of that incorrect amount of change.

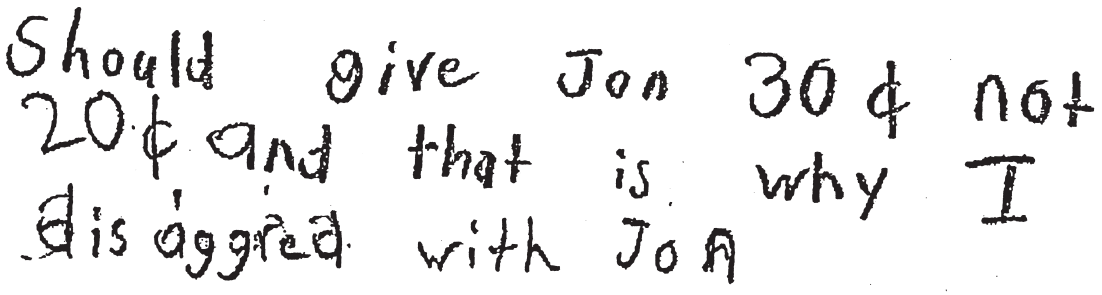
Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question

Jon did not give the correct change because one cup of lemonade is for 20¢ and the man gave Jon 50¢ and the man said he wanted to buy one cup and One cup is 20¢ and the man gave Jon 50¢ so 50¢ - 20¢ = 30¢ so Jon

More work area for question



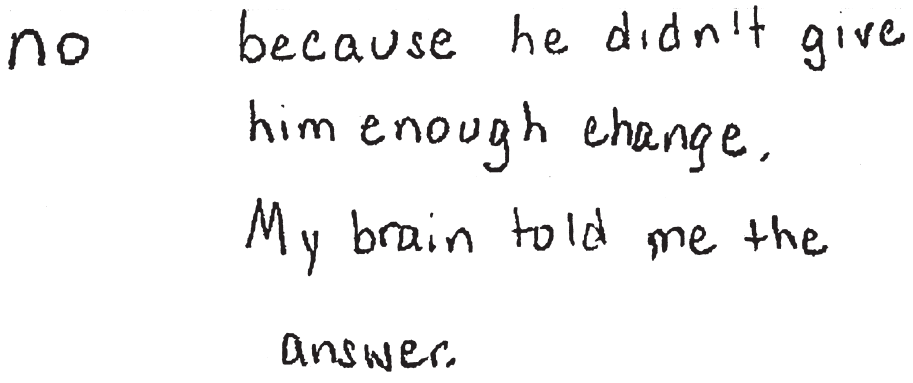
Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student shows a correct answer as to why 20 cents is not enough (*50¢-20¢=30¢*). The student fails to show any combination of correct change.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question

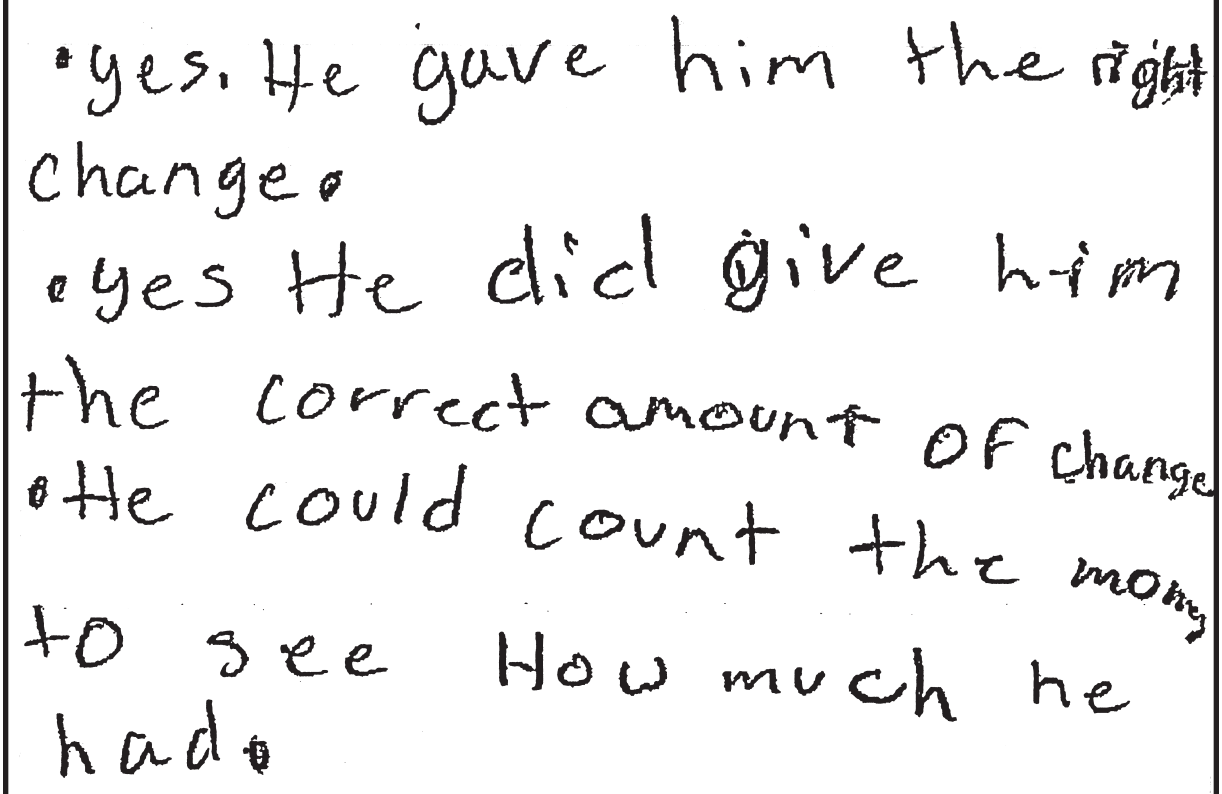


Score Point: 0
The response shows insufficient understanding of the problem's essential mathematical concepts. The only correct answer is "no."

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question



Score Point: 0
The response shows insufficient understanding of the problem's essential mathematical concepts. All answers are incorrect.

Jon had a lemonade stand. He sold each cup of lemonade for 20¢. A man gave Jon 50¢ and said that he wanted to buy 1 cup of lemonade. Jon gave the man 20¢ in change.

- Did Jon give the man the correct change? Show your work or explain your answer.
- Show one combination of coins that Jon could use to give the man the correct amount of change.
- Show another combination of coins that Jon could use to give the man the correct amount of change.

Work area for question

No because the man give two dollers to Jon and Jon give the incerect change.

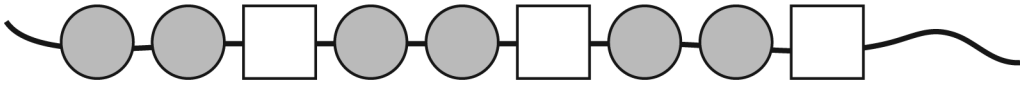
Jon have to give two dimes and another two dime and two nicals.

Jon have to give two quaters.

Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The only correct answer is "no." All other answers are incorrect.

Sophia is stringing beads for a necklace, as shown below.



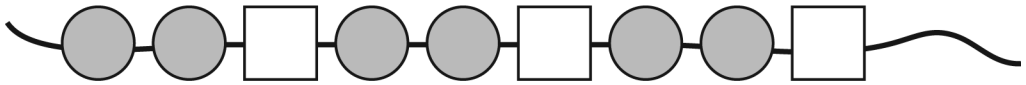
- If Sophia continues this pattern, what are the next three beads she will put on the string?

- If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.

Work area for question.

STANDARD 2 – GEOMETRY AND MEASUREMENT

Sophia is stringing beads for a necklace, as shown below.



- If Sophia continues this pattern, what are the next three beads she will put on the string?

- If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.

Sample Solution:

- Circle, circle, square.

- 7, for every 2 circles there is one square. If there are 14 circles, 14/2 = 7.

  OR

- circle, circle, square

- 6, CCS, CCS, CCS, CCS, CCS, CCS, CC

Scoring Rubric

3 Points
The student

- correctly draws the next three beads Sophia will string
- correctly determines Sophia will use 6 or 7 square beads **and** shows work (e.g., 14/2 = 7; extension of the pattern until 14 circle beads have been used)

2 Points
The student

- correctly draws the next three beads Sophia will string
- correctly determines Sophia will use 6 or 7 square beads **but** shows incomplete, incorrect, or missing work

OR

- correctly draws the next three beads Sophia will string
- incorrectly determines the number of square beads Sophia will use **but** shows correct work for 6 or 7 square beads

OR

- correctly determines Sophia will use 6 or 7 square beads **and** shows work (e.g., 14/2 = 7; extension of the pattern until 14 circle beads have been used)

OR

- correctly draws the next three beads Sophia will string
- determines the number of square beads (4 or 5) based on a total of 14 beads and not 14 circle beads

1 Point
The student

- correctly draws the next three beads Sophia will string

OR

- correctly determines Sophia will use 6 or 7 square beads **but** shows incomplete, incorrect, or missing work

OR

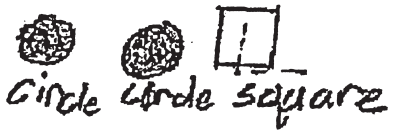
- response shows limited understanding of the problem's mathematical concepts

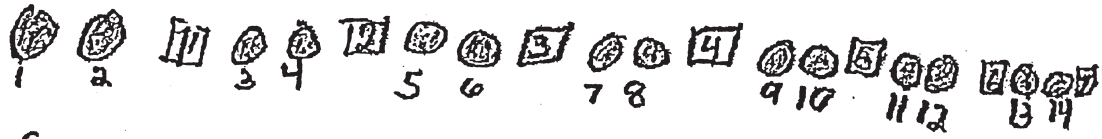
0 Points
The response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Sophia is stringing beads for a necklace, as shown below.

- **If Sophia continues this pattern, what are the next three beads she will put on the string?**
- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question





Sophia would have 7 squares if she had 14 circles.

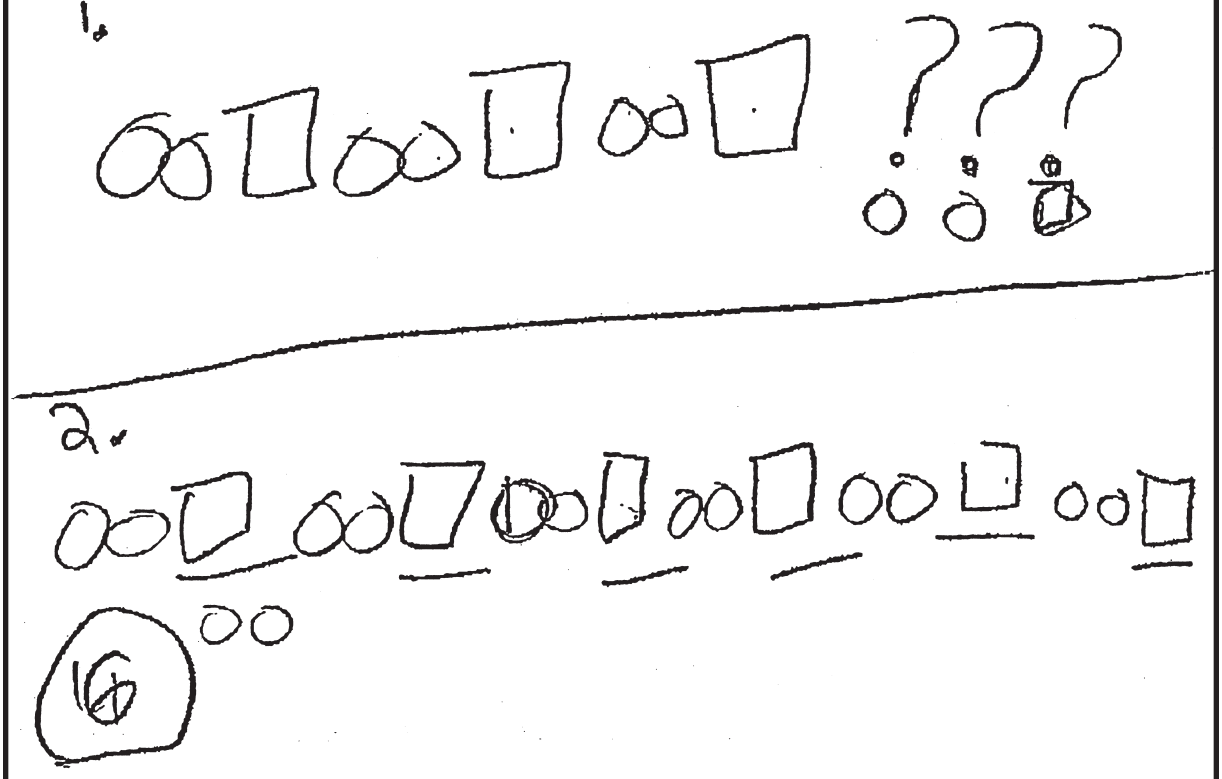
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly draws the next three beads Sophia will string. The student correctly determines Sophia will use 6 or 7 beads (*7 squares if she had 14 circles*) and shows work (extension of the pattern).

Sophia is stringing beads for a necklace, as shown below.

- **If Sophia continues this pattern, what are the next three beads she will put on the string?**
- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question



Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly draws the next three beads Sophia will string. The student correctly determines Sophia will use 6 or 7 beads (*6*) and shows work (extension of the pattern).

Sophia is stringing beads for a necklace, as shown below.

1. **If Sophia continues this pattern, what are the next three beads she will put on the string?**

2. **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question

1 The next three are ○○□.

2 7. I know this because each square is like 2 circles. So I did 2x□=14. The answer is 7, because 7+7=14.

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly draws the next three beads Sophia will string. The student correctly determines Sophia will use 6 or 7 beads (7) and shows mathematical work to support the answer.

Sophia is stringing beads for a necklace, as shown below.

1. If Sophia continues this pattern, what are the next three beads she will put on the string?

2. If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer. 7

Work area for question

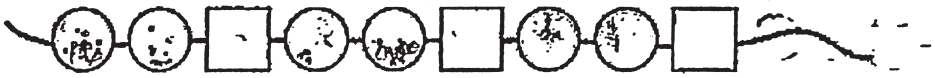
1. 

2

Score Point: 2

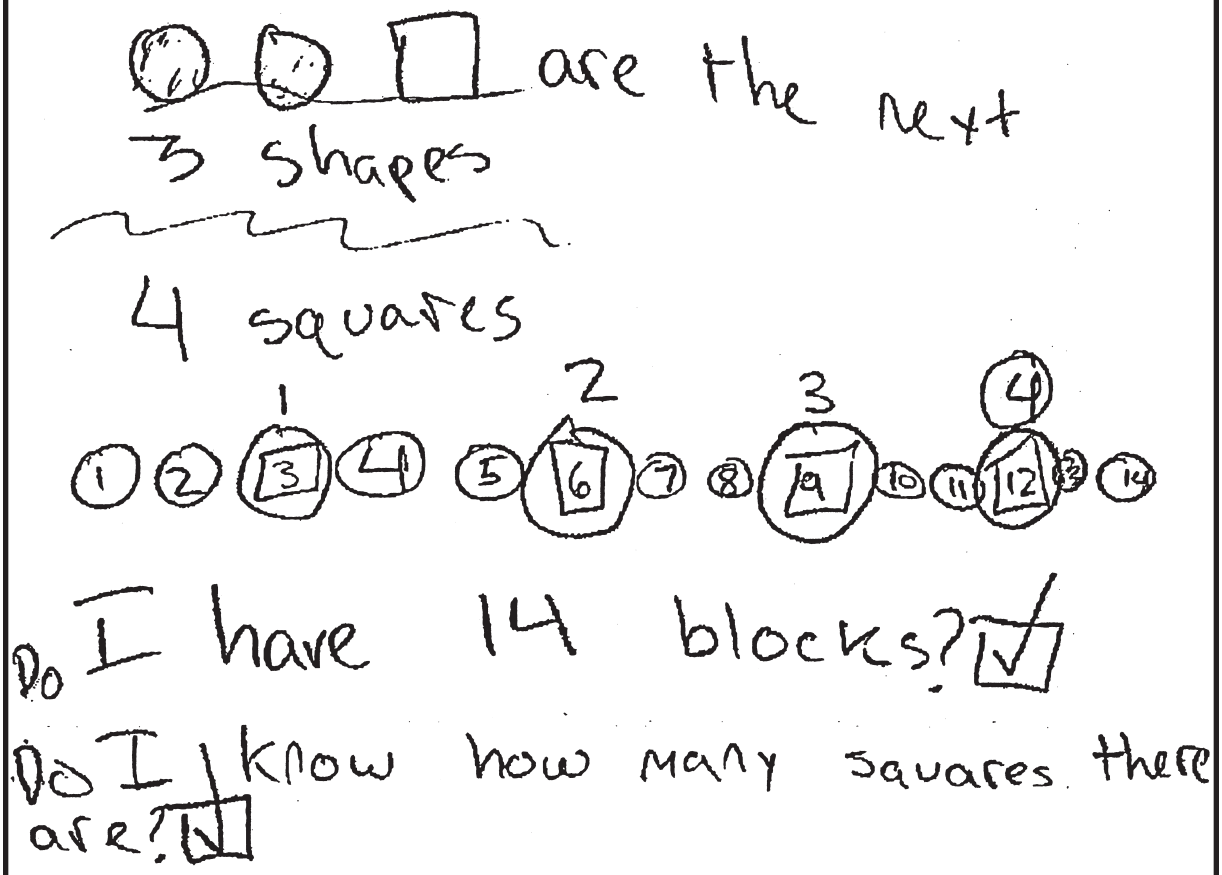
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student correctly draws the next three beads Sophia will string. The student correctly determines Sophia will use 6 or 7 beads (*7*); however, no work is shown to support the answer.

Sophia is stringing beads for a necklace, as shown below.



- **If Sophia continues this pattern, what are the next three beads she will put on the string?**
- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question



Score Point: 2

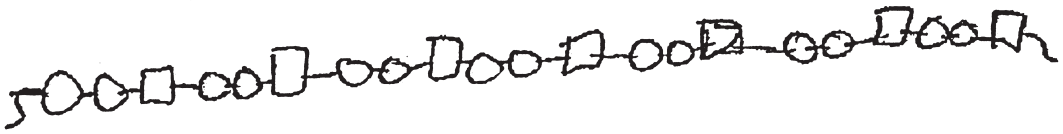
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student correctly draws the next three beads Sophia will string. The student correctly determines Sophia will use 4 or 5 beads (*4 squares*) based on a total of 14 beads (not a total of 14 circle beads) and shows work to support the answer.

Sophia is stringing beads for a necklace, as shown below.

- **If Sophia continues this pattern, what are the next three beads she will put on the string?**
- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question

The next 3 beads are 2 circles and 1 square. If sophia contnues her pattern until she has used a total of 14 circle beads, She will have used 10 square beads.



Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student correctly writes the next three beads Sophia will string (*2 circles and 1 square*). The student incorrectly determines Sophia will use *10 square beads;* however, correct work is shown for 7 square beads.

Sophia is stringing beads for a necklace, as shown below.

- If Sophia continues this pattern, what are the next three beads she will put on the string?
- If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.

Work area for question

19
+19

23

Sophia will have 23 square beeds. because I added 4 and 14 and it equaled 23.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student correctly draws the next 3 beads Sophia will string. The student determines Sophia will use *23 square beeds,* which is an incorrect response.

Sophia is stringing beads for a necklace, as shown below.

- **If Sophia continues this pattern, what are the next three beads she will put on the string?**
- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question

1. The next three beads would be 2 circles and 1 square

2. If Sophia continues her pattern until she has used a total of 14 circle beads she will have 3 square beads.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student correctly writes the next three beads Sophia will string (*2 circles and 1 square*). The student states Sophia will use *3 square beads* based on a total of 14 circle beads, which is an incorrect response.

Sophia is stringing beads for a necklace, as shown below.

- If Sophia continues this pattern, what are the next three beads she will put on the string?
- If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.

Work area for question

2 circles

10 circles 4 squares

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student writes the next three beads Sophia will string (*2 circles*), which is an incorrect response. The student determines that Sophia will use *4 squares* based upon a total of 14 beads.

Sophia is stringing beads for a necklace, as shown below.

- If Sophia continues this pattern, what are the next three beads she will put on the string?

- If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.

Work area for question

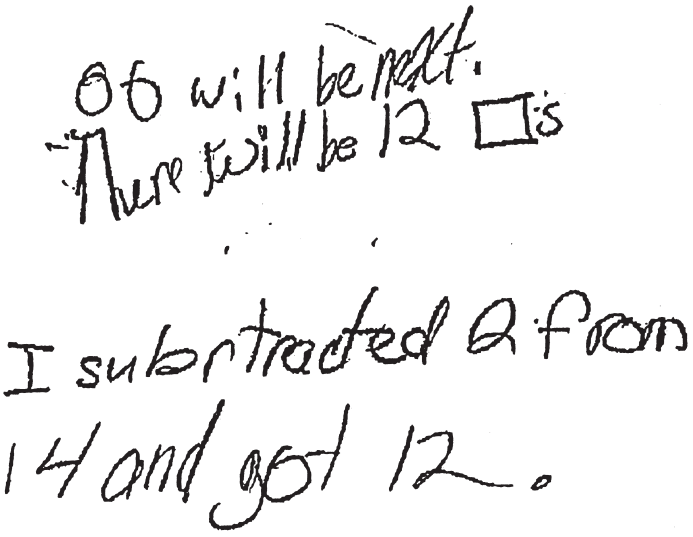
Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student's response (a drawing of another bead pattern) is incorrect for either of the bullets.

Sophia is stringing beads for a necklace, as shown below.

- **If Sophia continues this pattern, what are the next three beads she will put on the string?**
- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

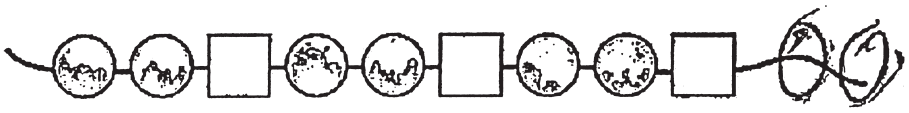
Work area for question



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student incorrectly draws the next three beads Sophia will string (2 circles). The student writes *there will be 12* (draws a square), which is an incorrect response.

Sophia is stringing beads for a necklace, as shown below.



- **If Sophia continues this pattern, what are the next three beads she will put on the string?**

- **If Sophia continues her pattern until she has used a total of 14 circle beads, how many square beads will she have used? Show your work or explain your answer.**

Work area for question

Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student incorrectly draws the next three beads Sophia will string (2 circles) and writes *3* as the answer to the second bullet.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.
- If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.

Work area for question.

STANDARD 3 – PATTERNS AND ALGEBRA

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.
- If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.

Sample Solution:

- $20 - 6 = 14$
- 2½ more weeks, $6 \times 2.5 = 15$

  OR

- $20 - 6 = 14$
- 3 more weeks, $6 \times 3 = 18$

  OR

- $20 - 6 = 14$
- 4 weeks, $6 \times 4 = 24$

Scoring Rubric

3 Points
The student

- writes and solves a correct number sentence (e.g., 20 – 6 = 14)
- writes the correct number of weeks Jackie will need (2½ to 4) **and** shows work

2 Points
The student

- writes and solves a correct number sentence (e.g., 20 – 6 = 14)
- writes the correct number of weeks Jackie will need (2½ to 4) **but** work may be incomplete, incorrect, or missing

OR

- writes a correct number sentence but does not solve it
- writes the correct number of weeks Jackie will need (2½ to 4) **and** shows work

OR

- does not write a number sentence but shows the work for 14 (vertical work)
- writes the correct number of weeks Jackie will need (2½ to 4) **and** shows work

OR

- commits a calculation error
- writes a correct number of weeks based on the error and shows work

1 Point
The student

- writes a correct number sentence **but** doesn't solve it
- writes the correct number of weeks Jackie needs (2½ to 4) **but** work may be incomplete, incorrect, or missing

OR

- writes and solves the correct number sentence

OR

- writes the correct number of weeks Jackie needs (2½ to 4) **and** shows work

OR

- response shows limited understanding of the problem's mathematical concepts

0 Points
The response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**
- **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question

20-6=14

It will take her
3 weeks and 2 days because
6=1 week and 6+6+6=18 and
She all ready has 6.

Score Point: 3

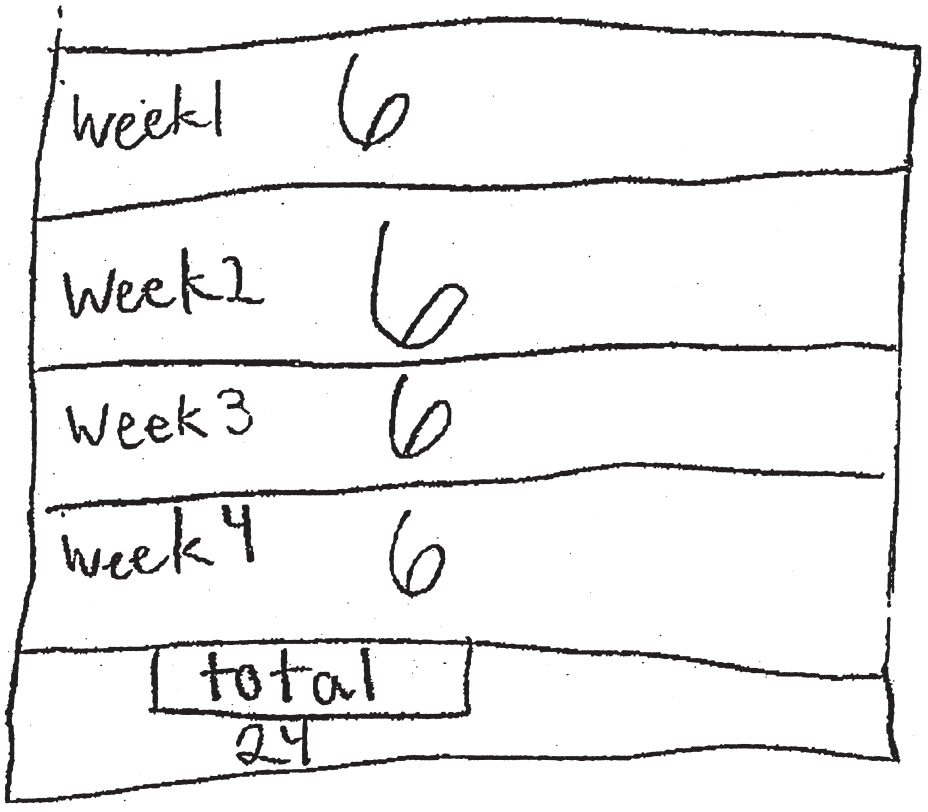
The response shows complete understanding of the problem's essential mathematical concepts. The student writes and solves a correct number sentence (*20-6=14*). The student writes the correct number of weeks it will take Jackie to save 20 milk cartons (*3 weeks and 2 days*) and shows supporting work.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

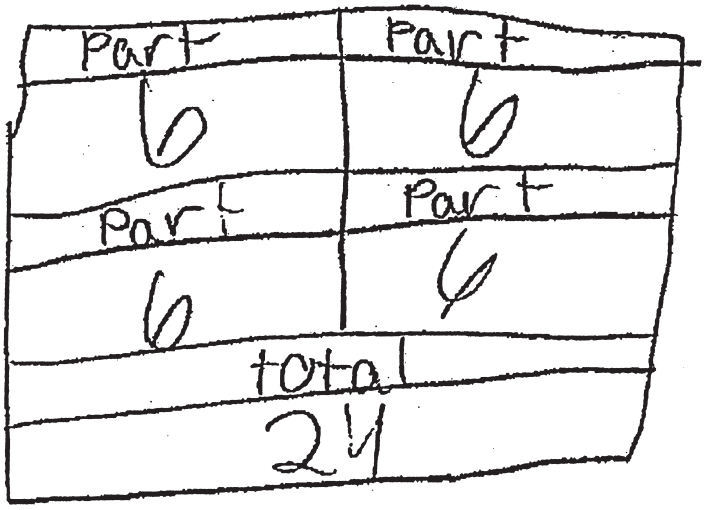
- Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.
- If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.

Work area for question

$20 - 6 = 14$



More work area for question



If she saves 6 milk cartons a week it will take 4 weeks to get 24, but she will have 4 extas.

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes and solves a correct number sentence (*20-6=14*). The student writes the correct number of weeks it will take Jackie to save 20 milk cartons (*4 weeks to get 24*) and shows supporting work through the use of a table/chart.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

1. **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**

2. **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question

1. 20 - 6 = 14

2.

week	week 1	week 2	week 3	part of week 4	
milk cartons	6	12	18	20	

The reason why I put part of is because if I did 6 more that would equal 24 and that is a little to much.

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes and solves a correct number sentence (*20-6=14*). The student writes the correct number of weeks it will take Jackie to save 20 milk cartons (*week 3 and part of week 4*) and shows supporting work through the use of a table.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**
- **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question

- 1 10
  ~~20~~
  − 6
  14 more milk cartons

Milk Cartons Jackie Saved	
Weeks	Number
Week 1	6
Week 2	12
Week 3	18
Week 4	24

- It will take 4 weeks. The reason why is because I kept adding 6 until I was up to 20 or more.

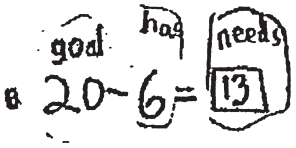
Score Point: 2

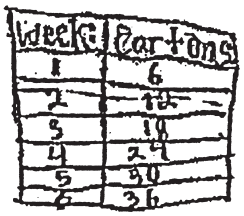
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student does not write a number sentence but finds the correct solution (*14 more milk cartons*). The student makes a correct chart to show how many weeks it will take until Jackie saves 20 milk cartons.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**
- **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question





Three more weeks. but she will have four carnons left over.

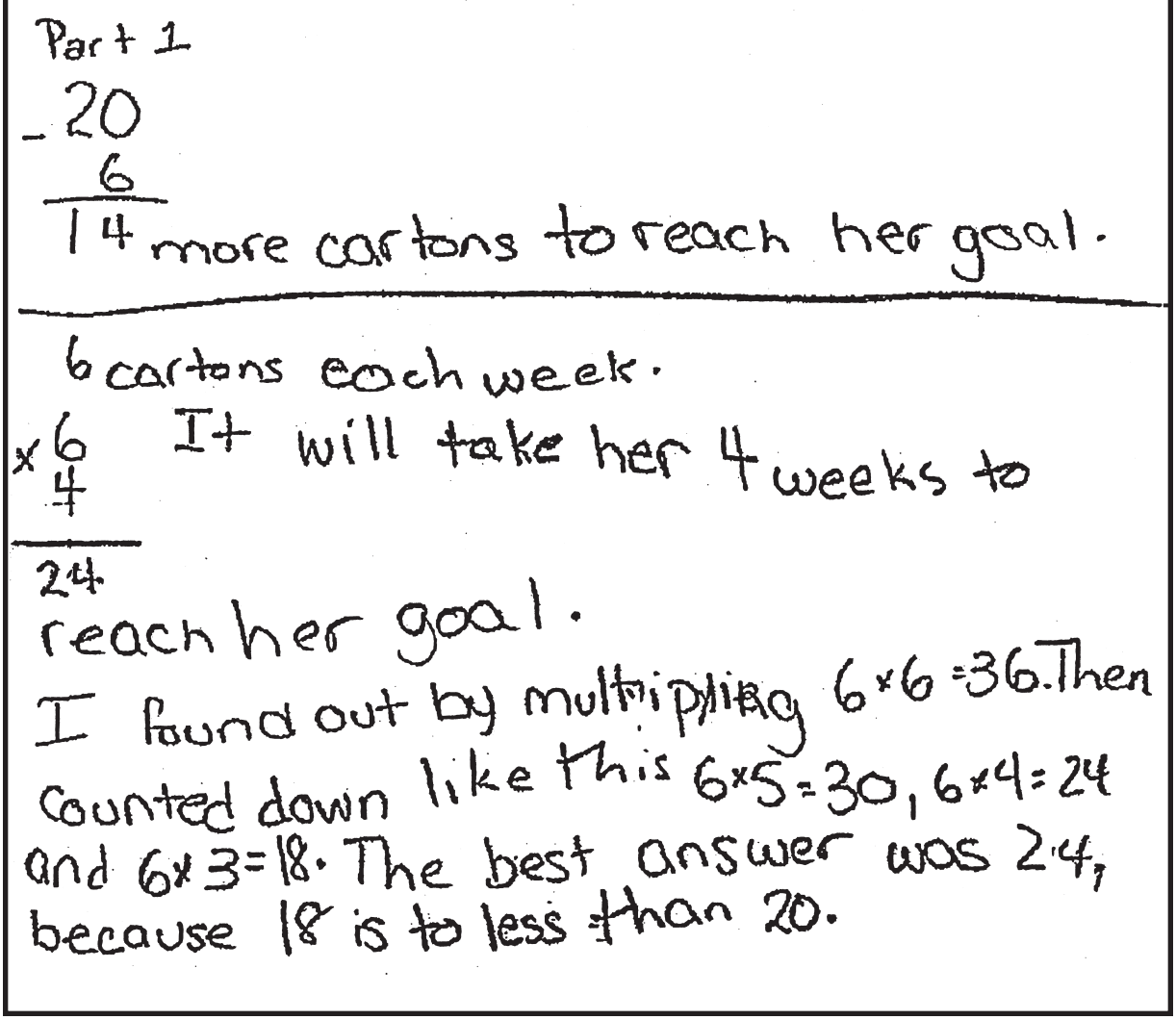
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes a number sentence correctly but gets the incorrect solution. (*20-6=13*). The student writes the correct number of weeks it will take Jackie to save 20 milk cartons (*3 more weeks but she will have four carnons left over*) and shows supporting work through the use of a table/chart.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**
- **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question



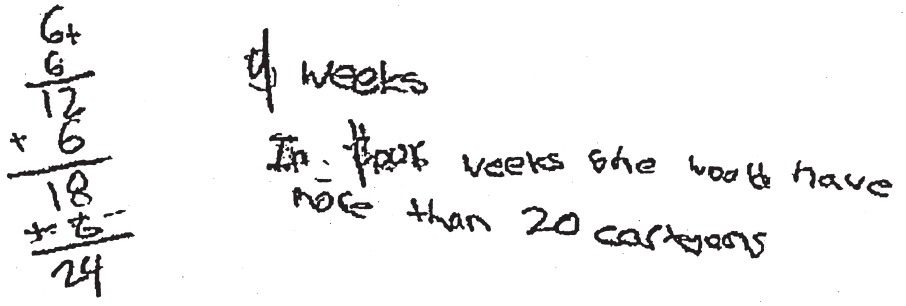
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student does not write a number sentence but finds the correct solution (*14 more cartons to reach her goal*). The student writes a correct statement that Jackie will need *4 weeks to reach her goal* and shows supporting work.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**
- **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question



Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student does not write or solve the correct number sentence. The student writes a correct statement that in *four weeks she would have more than 20 cartons* and shows supporting work.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.
- If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.

Work area for question

4x6=24

4 because six times four is twenty four and that is the closest you can get.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student does not write or solve the correct number sentence. The student writes a correct statement that Jackie will need *4* weeks to save 20 milk cartons and shows supporting work.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- **Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.**
- **If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.**

Work area for question

It will take 4 weeks 6x4=24
for Jackie to save 20 cartons
because 6x4=24.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student does not write or solve the correct number sentence. The student writes a correct statement that Jackie will need *4* weeks to save 20 milk cartons and shows supporting work.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.
- If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.

Work area for question

3 cartons

6 x 4 = 24

Score Point: 0

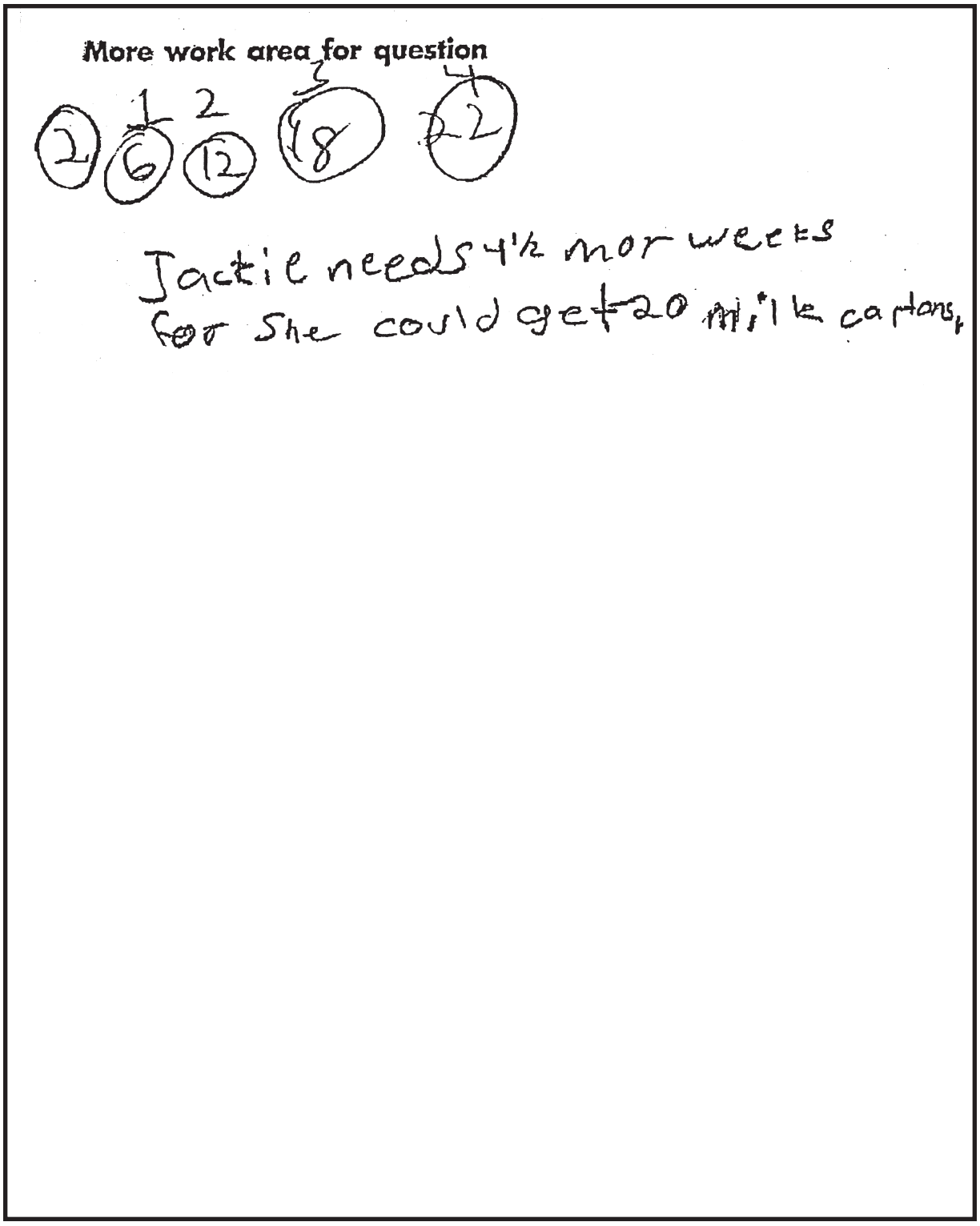
The response shows insufficient understanding of the problem's essential mathematical concepts. The student response only shows work for the number of weeks needed for Jackie to save 20 milk cartons but does not write how many weeks it will take, nor does the student write and solve a correct number sentence.

Jackie needs 20 milk cartons for a science project. She has saved 6 milk cartons in one week.

- Write and solve a number sentence to find how many more milk cartons Jackie needs to meet her goal of 20 milk cartons.
- If Jackie continues to save 6 milk cartons each week, how many weeks will it take Jackie to save 20 milk cartons? Show your work or explain your answer.

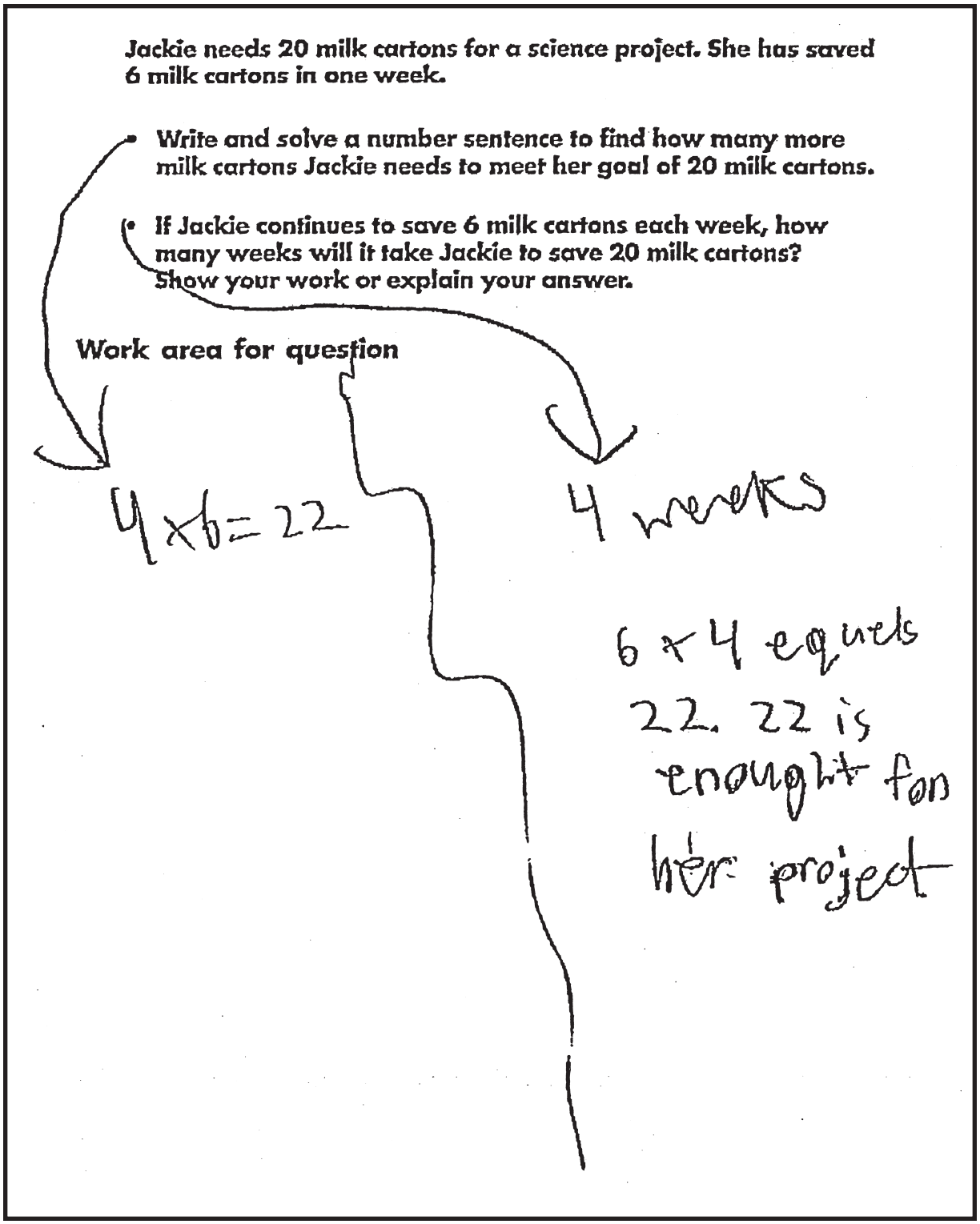
Work area for question

1 Jackie needs 4 1/2 mor weeks. to get 20 milk cartons,



Score Point: 0

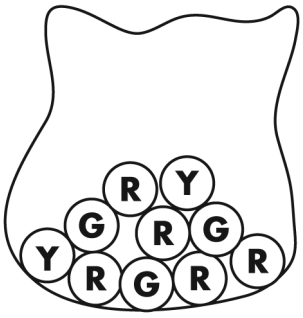
The response shows insufficient understanding of the problem's essential mathematical concepts. The student writes an incorrect number of weeks, *4½ mor weeks,* and shows incorrect work. The student does not write and solve a correct number sentence.



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student states the correct number of weeks but shows incorrect work. The student does not write and solve a correct number sentence.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?

- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

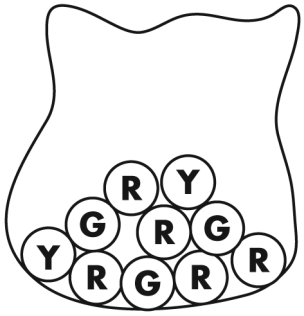
Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question.

STANDARD 4 – DATA ANALYSIS, PROBABILITY, AND DISCRETE MATHEMATICS

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Sample Solution:

- Least likely OR 2 out of 10
- Red, there is a 5 out of 10 chance
- Equally likely with green because there are 3 of each OR 3 out of 8 because there are 3 red and 8 total

Scoring Rubric

3 Points
The student

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag
- correctly identifies the red jelly bean as more likely to be pulled from the bag **and** provides an appropriate explanation (e.g., it has a 5/10 probability; because it is greater than the other two colors)
- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **and** provides an appropriate explanation (e.g., There is an equal number of red and green jelly beans, which are both greater than yellow.)

2 Points
The student

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag
- correctly identifies the red jelly bean as more likely to be pulled from the bag **and** provides an appropriate explanation

OR

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag
- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **and** provides an appropriate explanation

OR

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag
- correctly identifies the red jelly bean as more likely to be pulled from the bag **but** explanation may be incomplete, incorrect, or missing
- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **but** explanation may be incomplete, incorrect, or missing

OR

- correctly identifies the red jelly bean as more likely to be pulled from the bag **and** provides an appropriate explanation
- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **and** provides an appropriate explanation

1 Point

The student

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag
- correctly identifies the red jelly bean as more likely to be pulled from the bag **but** explanation may be incomplete, incorrect, or missing

OR

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag
- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **but** explanation may be incomplete, incorrect, or missing

OR

- correctly identifies the red jelly bean as more likely to be pulled from the bag **but** explanation may be incomplete, incorrect, or missing
- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **but** explanation may be incomplete, incorrect, or missing

OR

- writes the correct probability of 2/10 or least likely for pulling a yellow jelly bean from the bag

OR

- correctly identifies the red jelly bean as more likely to be pulled from the bag **and** provides an appropriate explanation

OR

- writes the correct new probability of pulling a red jelly bean as 3/8 or equally likely with a green jelly bean **and** provides an appropriate explanation

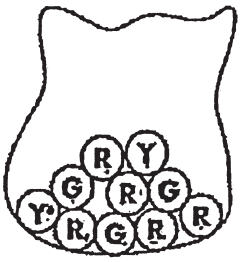
OR

- response shows limited understanding of the problem's mathematical concepts

0 Points

The response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- **What is the probability of pulling a yellow jelly bean from the bag?**
- **Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.**

Andrew pulled 2 red jelly beans from the bag and ate them.

- **Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.**

Work area for question

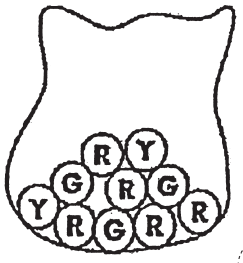
1. $\frac{2}{10}$

2. BRed because it's a five of 10 chance.

3. $\frac{3}{8}$ chance because you took out two reds and that takes away two from the bag.

Score Point: 3
The response shows complete understanding of the problem's essential mathematical concepts. The student writes the correct probability of pulling a yellow jelly bean from the bag (*2/10*), correctly identifies red as more likely to be pulled and provides an appropriate explanation (*because it's a five of 10 chance*), and writes the correct new probability of pulling a red jelly bean as *3/8* with appropriate explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- **What is the probability of pulling a yellow jelly bean from the bag?**
- **Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.**

Andrew pulled 2 red jelly beans from the bag and ate them.

- **Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.**

Work area for question

8
(5 + 3) + 2 = 10 jellybeans

2 out of 10

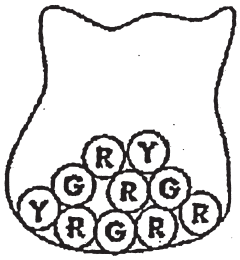
red because 1 5 7 2 and 5 7 3.

3 out of 8

10 − 2 = 8 jellybeans

Score Point: 3
The response shows complete understanding of the problem's essential mathematical concepts. The student writes the correct probability of pulling a yellow jelly bean from the bag (*2 out of 10*), correctly identifies red as more likely to be pulled and provides an appropriate explanation, and writes the correct new probability of pulling a red jelly bean as *3 out of 8* with supporting work.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- **What is the probability of pulling a yellow jelly bean from the bag?**
- **Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.**

Andrew pulled 2 red jelly beans from the bag and ate them.

- **Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.**

Work area for question

1 $\frac{2}{10}$

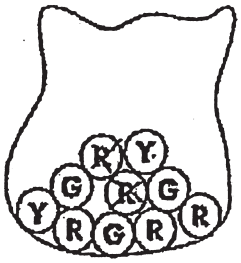
2 red because there are more red than any other color.

3 $\frac{3}{8}$ $\frac{5}{2}$ and $\frac{10}{2}$ $\frac{2}{8}$ So $\frac{3}{8}$.

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes the correct probability of pulling a yellow jelly bean from the bag (*2/10*), correctly identifies red as more likely to be pulled and provides an appropriate explanation (*because there are more red than any other color*), and writes the correct new probability of pulling a red jelly bean as *3/8* with supporting work.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question

$\frac{1}{10}$ yellow

Red because there's 5 red and only 3 green, and 2 yellow.

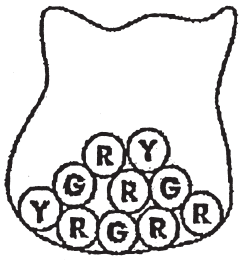
More work area for question

$\frac{3}{8}$ because there was ten but sence he took 2, 10 - 2 = 8 so there was 3 red left.

Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes an incorrect probability of pulling a yellow jelly bean from the bag (*1/10*), correctly identifies red as more likely to be pulled and provides an appropriate explanation (*because thers 5 red and only 3 green, and 2 yellow*), and writes the correct new probability of pulling a red jelly bean as *3/8* with supporting work/explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

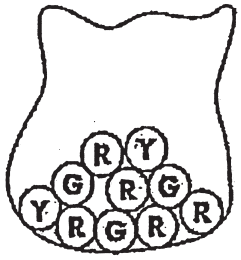
Work area for question

Yellow has the least problability.
He is more likley to pull out red because there are more reds than any other coler.
The problability for red is the same problability for green.

Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes the correct probability of pulling a yellow jelly bean from the bag (*least probability*), correctly identifies red as more likely to be pulled and provides an appropriate explanation (*because there are more reds than any other color*), and writes the correct new probability of pulling a red jelly bean as *the same probability for green;* however, there is no supporting work/explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.

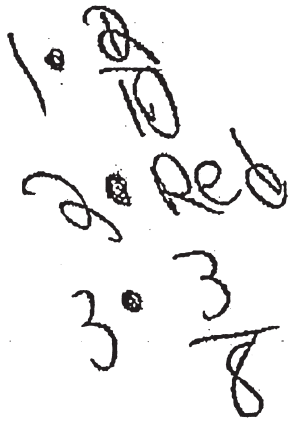


- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

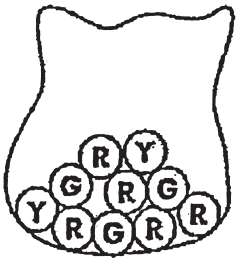
- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question



Score Point: 2
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes the correct probability of pulling a yellow jelly bean from the bag (*2/10*), correctly identifies red as more likely to be pulled but provides no explanation, and writes the correct new probability of pulling a red jelly bean as *3/8* with no supporting work/explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



1 • What is the probability of pulling a yellow jelly bean from the bag?

2 • Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

3 • Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question

1. The probability of pulling a yellow jelly bean from the bag is one out of ten
2. Andrew is more likely to pull a red jelly bean from the bag because there is more red jelly beans then any other.
3. The probability of picking another red jelly bean is one out of eight. I got my answer by knowing that there was 10 jelly beans before and since Andrew ate 2, there are 8

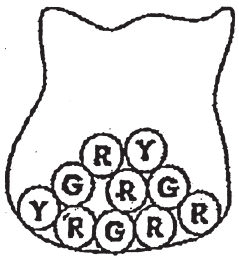
More work area for question

jelly beans left. Therefore, the probability of picking another red jelly bean is one out of eight.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student writes an incorrect probability of pulling a yellow jelly bean as *one out of ten,* correctly identifies red as more likely to be pulled and provides an appropriate explanation (*more red jelly beans than any other*), and writes an incorrect new probability of pulling a red jelly bean as *one out of eight.*

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



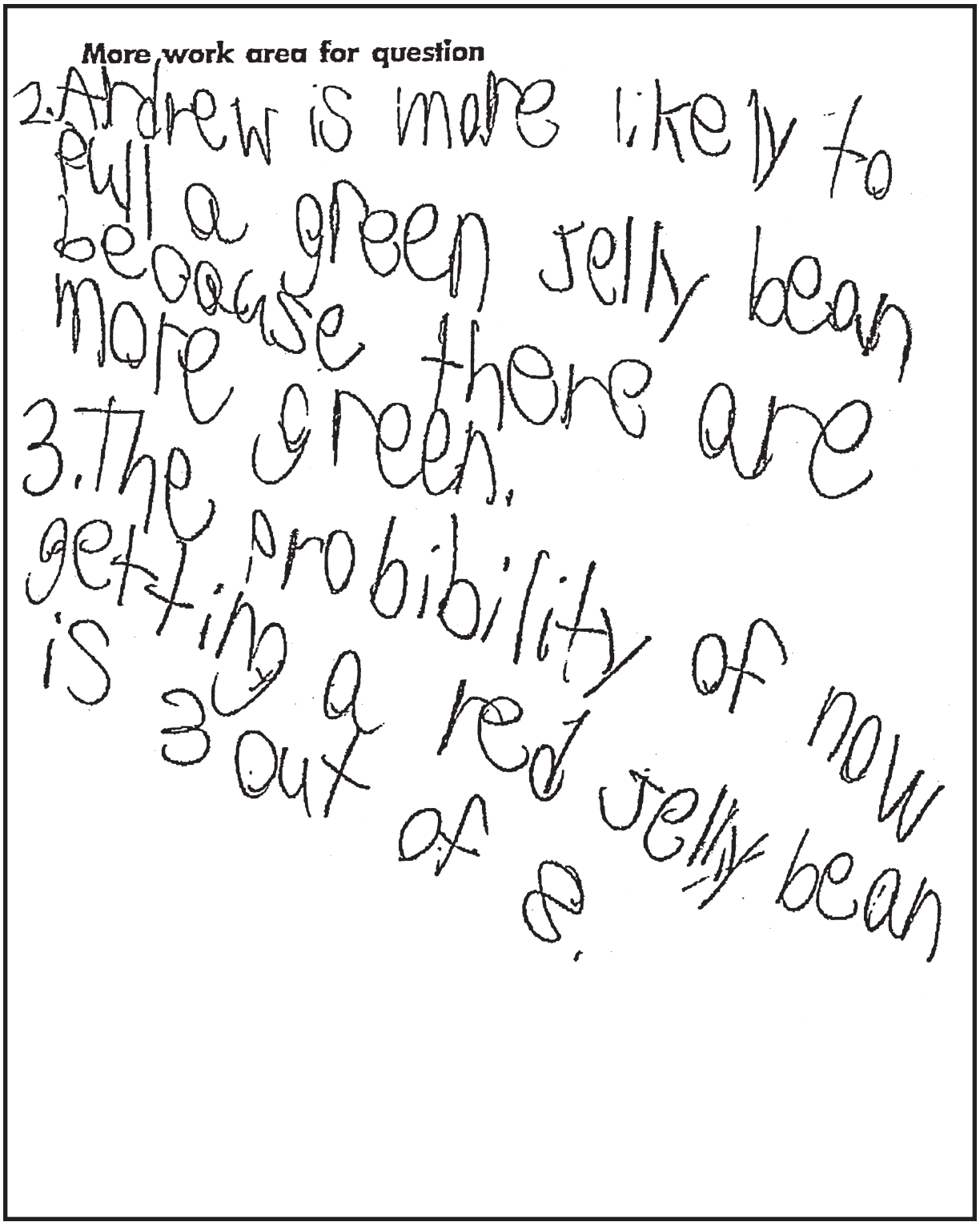
- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

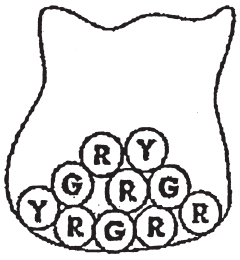
Work area for question

1. The probibility of pulling a yellow is 2 out of 10 from the bag



Score Point: 1
The response shows limited understanding of the problem's essential mathematical concepts. The student writes the correct probability of pulling a yellow jelly bean as *2 out of 10,* incorrectly identifies *green* as more likely to be pulled and provides an inappropriate explanation, and writes the correct new probability of pulling a red jelly bean as *3 out of 8* with no supporting work/explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question

There is a little probability of Andrew pulling a yellow jelly bean out of the bag. Andrew is most likely to pull out a red jelly bean because there are more red jelly beans than any other

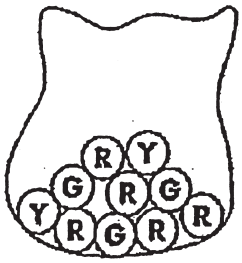
More work area for question

color. Now andrew has less probability of picking out a red because he now has less red jelly beans in the bag.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student writes an incorrect probability of pulling a yellow jelly bean (*little probability*), correctly identifies red as more likely to be pulled and provides an appropriate explanation (*more red jelly beans than any other*), and writes an incorrect new probability of pulling a red jelly bean (*less probability*) with an inappropriate explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

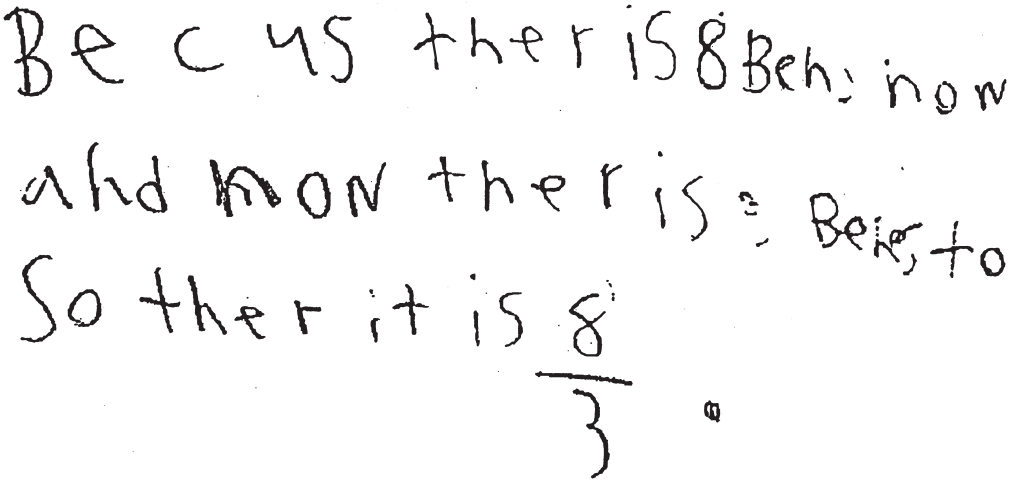
Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question

$\frac{10}{4} = 2$ | red | $= \frac{8}{3}$.

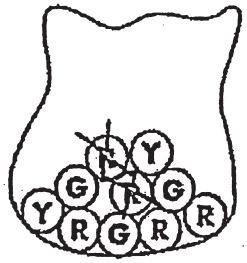
More work area for question



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student writes an incorrect probability of pulling a yellow jelly bean (*10/2*), correctly identifies red as more likely to be pulled but provides no explanation, and writes an incorrect new probability of pulling a red jelly bean (*8/3*).

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag?
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer.

Andrew pulled 2 red jelly beans from the bag and ate them.

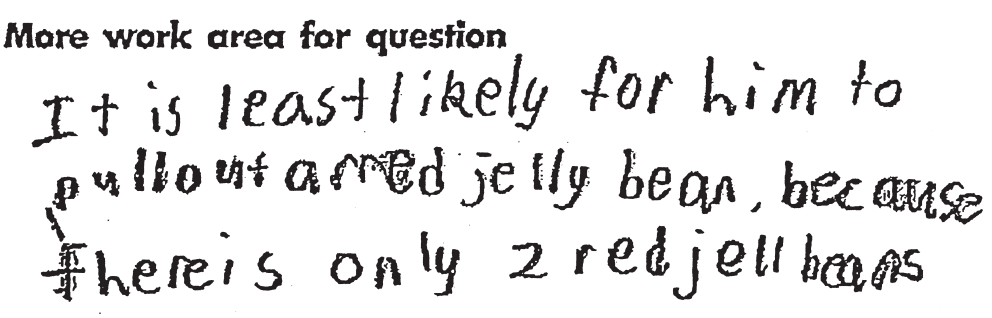
- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer.

Work area for question

likely

He will most likely pull a yellow one out because there is more yellow than any other colors

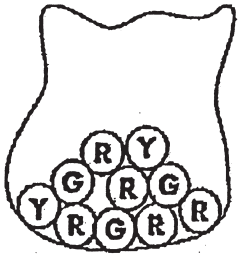
More work area for question



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student writes an incorrect probability of pulling a yellow jelly bean (*likely*), incorrectly identifies *yellow* as more likely to be pulled and provides an incorrect explanation, and writes an incorrect new probability of pulling a red jelly bean (*least likely*) with an incorrect explanation.

Andrew has a bag of jelly beans. In the bag there are 5 red, 3 green, and 2 yellow jelly beans. He will pull one jelly bean from the bag without looking.



- What is the probability of pulling a yellow jelly bean from the bag? Not likley
- Which color jelly bean is Andrew more likely to pull from the bag? Explain your answer. red

Andrew pulled 2 red jelly beans from the bag and ate them.

- Now what is the probability of Andrew pulling out another red jelly bean? Explain your answer. most likley

Work area for question

Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student writes an incorrect probability of pulling a yellow jelly bean as *not likely*, correctly identifies red as more likely to be pulled but provides no explanation, and writes an incorrect new probability of pulling a red jelly bean (*most likely*) with no explanation.

GRADE 4

OPEN-ENDED ITEMS

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- How many vans does the school need for the field trip? Show your work or explain your answer.
- How many students are in the last van? Show your work or explain your answer.

Work area for question.

STANDARD 1 – NUMBER AND NUMERICAL OPERATIONS

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- How many vans does the school need for the field trip? Show your work or explain your answer.

- How many students are in the last van? Show your work or explain your answer.

Sample Solution:

- 34, 237/7 = 33 R 6

- 6 students are in the last van because 33 buses will be filled and 1 more van will take 6 students, 1 teacher, and the driver.

Scoring Rubric

3 Points
The student

- writes 34 vans are needed **and** shows work (237/7 = 33 R 6)
- writes 6 students in the last van **and** shows work (33 buses will be filled all the way and 1 more van will take 6 students)

2 Points
The student

- writes 34 vans are needed **and** shows work
- writes 6 students in the last van

OR

- writes 34 vans are needed
- writes 6 students in the last van **and** shows work

OR

- writes 27 vans **and** shows work (237/9 = 26 R 3)
- writes 3 as 1 student, 1 teacher and 1 driver **and** shows work

OR

- writes one correct answer **but** may provide one incorrect answer due to a miscalculation or rounding error (33 instead of 34)
- provides the correct supporting work for both parts of the prompt

1 Point
The student

- writes 34 vans are needed **and** shows work

OR

- writes 6 students in the last van **and** shows work

OR

- writes 34 vans are needed
- writes 6 students in the last van

OR

- writes 26 vans **and** shows work (237/9 = 26 R 3)
- writes 3 as 1 student, 1 teacher and 1 driver **and** shows work

OR

- response shows limited understanding of the problem's mathematical concepts

0 Points
The response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

1. **How many vans does the school need for the field trip? Show your work or explain your answer.**

2. **How many students are in the last van? Show your work or explain your answer.**

Work area for question

1.
$$7\overline{)237} \quad 33\ R6$$
$$-21$$
$$27$$
$$-21$$
$$6$$

Everyone has to go to the field trip

33+1=34 vans

34 vans are needed to bring all the students to the field trip.

2. 6 students are on the last van.

6 students are on the last van because the remainder in the problem 237 ÷ 7 is six. The remainder in the problem 237 students ÷ 7 students in each van means that 6 students are left, but all the students need to go!

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes the correct answer of 34 vans and shows work. The student writes the correct answer of 6 students are in the last van and provides an explanation. (*The remainder in the problem 237 students ÷ 7 students in each van means that 6 students are left, but all the students need to go!*)

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- How many vans does the school need for the field trip? Show your work or explain your answer. 34
- How many students are in the last van? Show your work or explain your answer. 6 because that is the reamander.

Work area for question

$$\begin{array}{r} 33 \text{ r } 6 \\ 7\overline{)237} \\ 21 \\ \hline 27 \\ 21 \\ \hline 6 \end{array}$$

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes the correct answer of 34 vans and shows work. The student writes the correct answer of 6 students are in the last van and provides an explanation (*6 because that is the remainder*).

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.**
- **How many students are in the last van? Show your work or explain your answer.**

Work area for question

There are 34 vans because 237 divide by 7 equals 33 remainder 6 and 1 van takes 6

6 because 237 divide by 7 equals 33 remainder 6

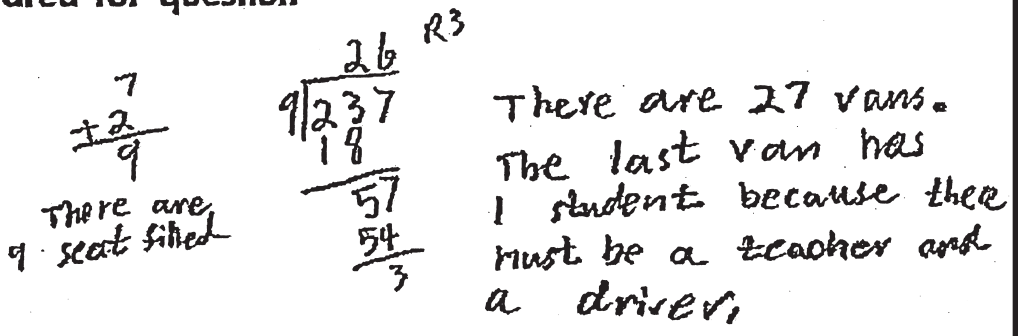
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student writes the correct answer of 34 vans and provides an explanation (*237 divide by 7 equals 33 remainder 6 and 1 van takes 6*). The student writes the correct answer of 6 students are in the last van and provides an explanation (*because 237 divide by 7 equals 33 remainder 6*).

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.**
- **How many students are in the last van? Show your work or explain your answer.**

Work area for question



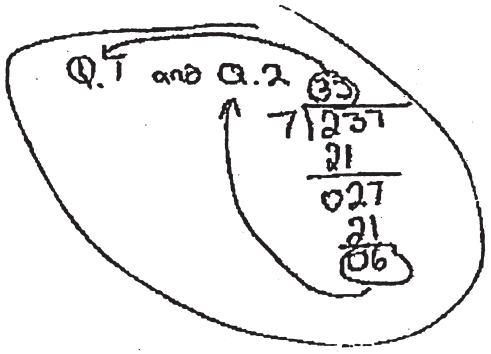
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes an incorrect answer of 27 vans and shows supporting work (*237/9 = 26 R 3*). The student misread the prompt and added 1 driver and 1 teacher in each van. Based on the error, the student writes the correct answer of 1 student is in the last van and provides an explanation (*because there must be a teacher and a driver*).

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.** 33 vans
- **How many students are in the last van? Show your work or explain your answer.** 6 students

Work area for question



Score Point: 2

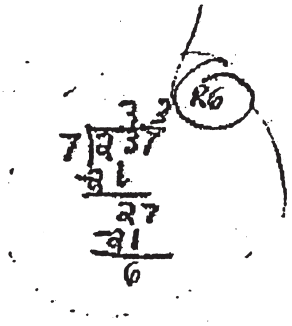
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes an incorrect answer of 33 vans but shows correct work. The student writes the correct answer of 6 students are in the last van and shows work by circling the remainder in the solution.

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.**
- **How many students are in the last van? Show your work or explain your answer.**

Work area for question

• Jackson Elementary School needs (33) vans to go on the field trip.



• (6) students would be in the last van.

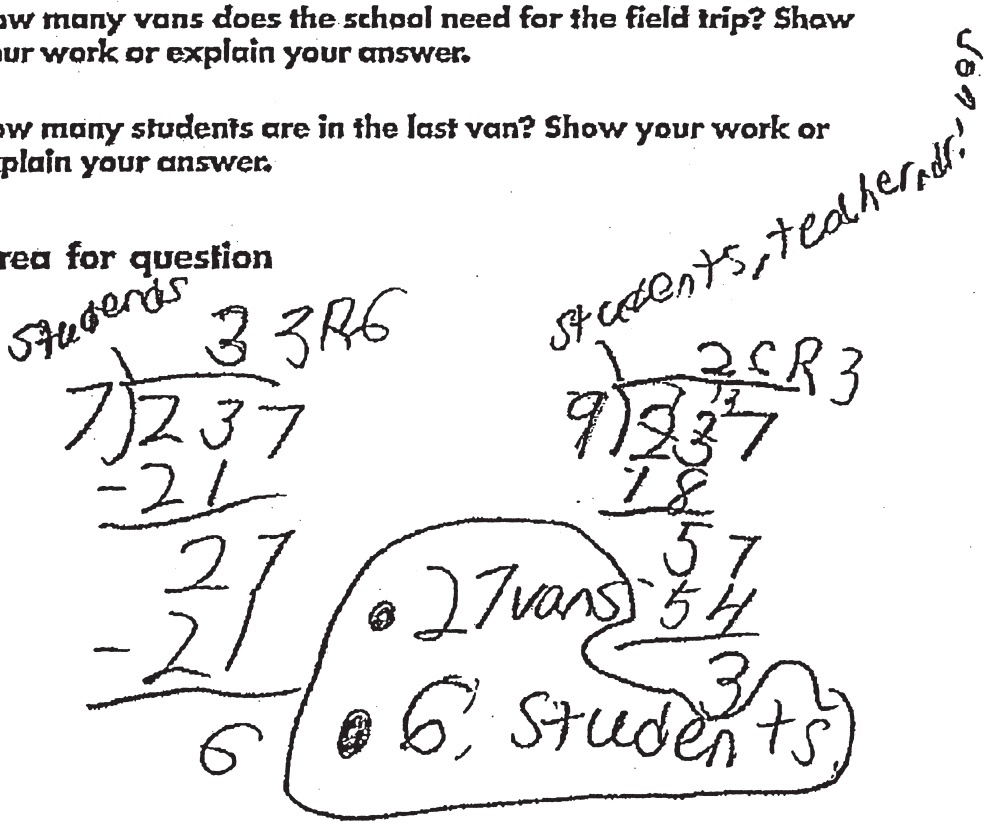
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student writes an incorrect answer of 33 vans but shows correct work. The student writes the correct answer of 6 students will be in the last van and shows work by circling the remainder in the solution.

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.**
- **How many students are in the last van? Show your work or explain your answer.**

Work area for question



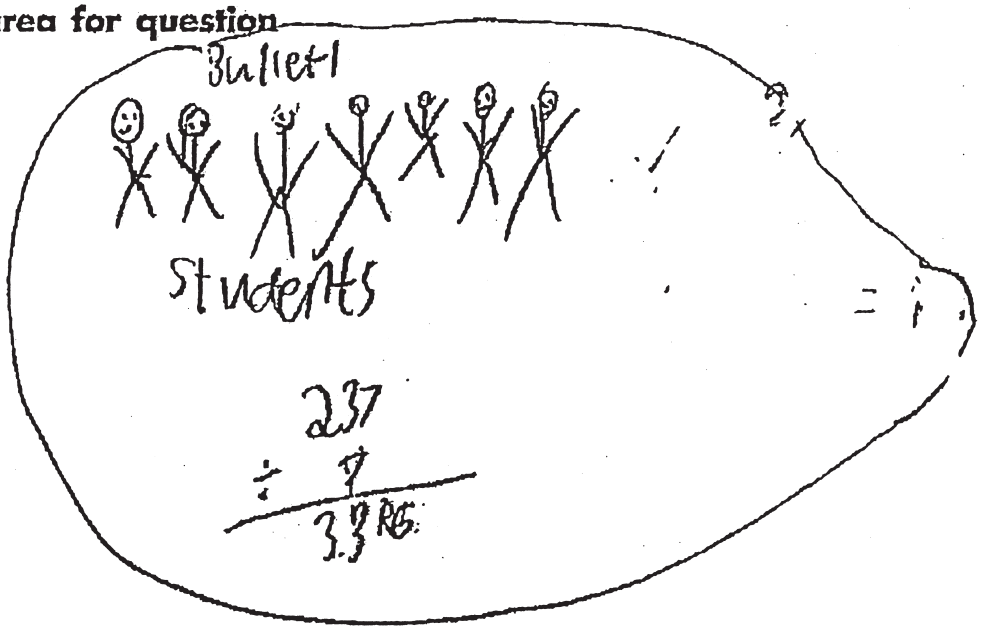
Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student writes an incorrect answer of 27 vans and shows work (*237/9 = 26 R 3*). However, the student does not follow through and instead writes the correct answer of 6 students are in the last van and shows work (*237/7 = 33 R 6*). The student receives credit for writing 6 and showing work.

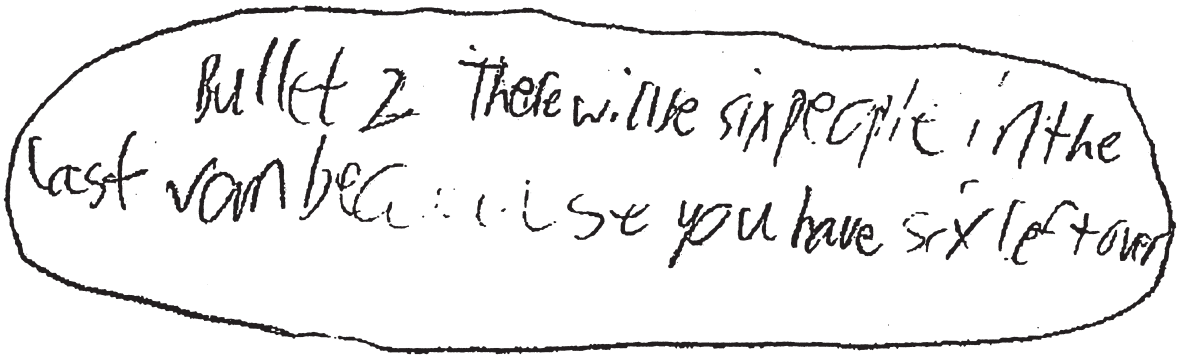
Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- How many vans does the school need for the field trip? Show your work or explain your answer.
- How many students are in the last van? Show your work or explain your answer.

Work area for question



More work area for question



Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student does not state how many vans are needed. The student does write that *There will be six people in the last van because you have six left over* and shows the supporting work (*237/7 = 33 R 6*).

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

1. **How many vans does the school need for the field trip? Show your work or explain your answer.**

34 vans

2. **How many students are in the last van? Show your work or explain your answer.**

Work area for question

1. 237 ÷ 7 = 33.8 → 34

2. 7+2=9

Driver teacher

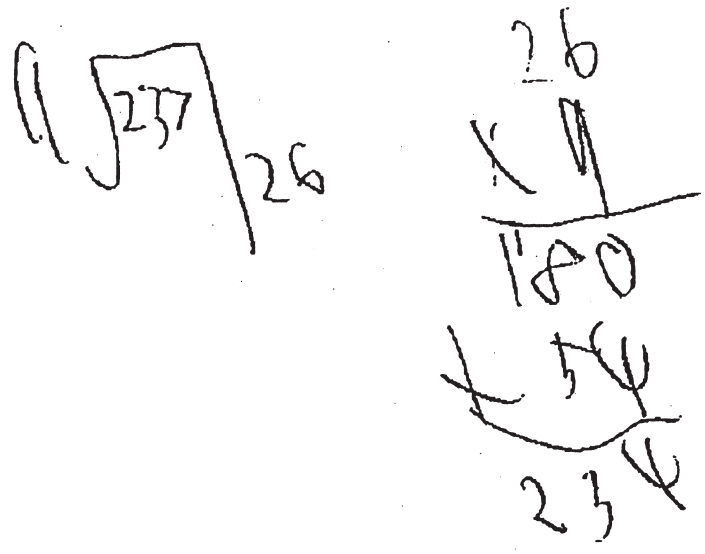
Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student writes the correct answer of 34 vans and shows supporting work (*237/7 = 33.8*). The student writes an answer of 9 showing that 7 are students and the 2 represents the driver and teacher. The 7 students is incorrect.

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.**
- **How many students are in the last van? Show your work or explain your answer.**

Work area for question



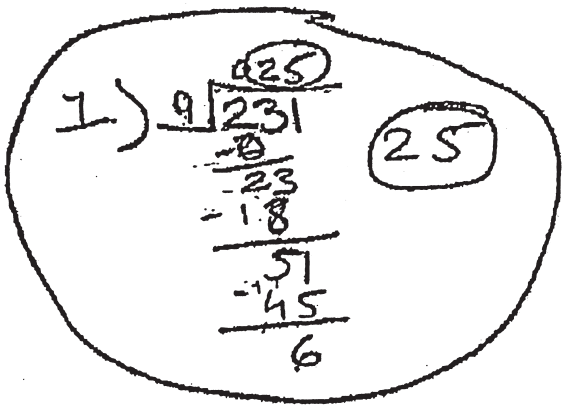
Score Point: 0

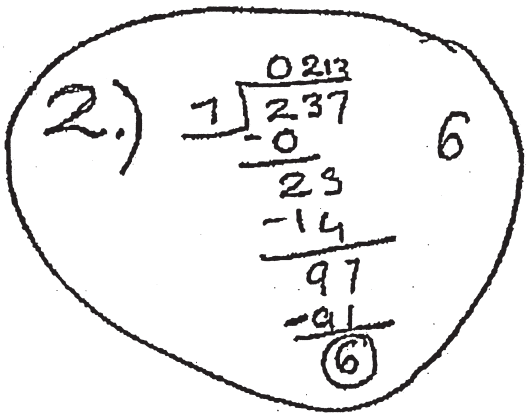
The response shows insufficient understanding of the problem's essential mathematical concepts. The student does not write an answer to either question, and shows partial and incorrect work (*237/9 = 26*).

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

- **How many vans does the school need for the field trip? Show your work or explain your answer.**
- **How many students are in the last van? Show your work or explain your answer.**

Work area for question





Score Point: 0

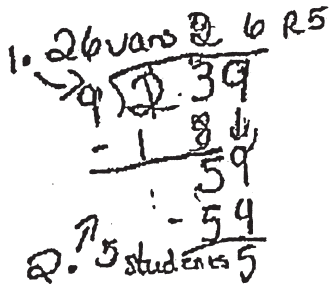
The response shows insufficient understanding of the problem's essential mathematical concepts. The student writes an incorrect answer of 25 vans and shows incorrect work (*231/9 = 25*). The student writes the correct answer of 6 students are in the last van but shows incorrect work (*237/7 = 0213*) with a remainder of 6.

Jackson Elementary School has 237 students who are riding in vans for a field trip. Each van holds 7 students, a driver, and a teacher. All vans, except the last van, will have every seat filled.

1. **How many vans does the school need for the field trip? Show your work or explain your answer.**

2. **How many students are in the last van? Show your work or explain your answer.**

Work area for question

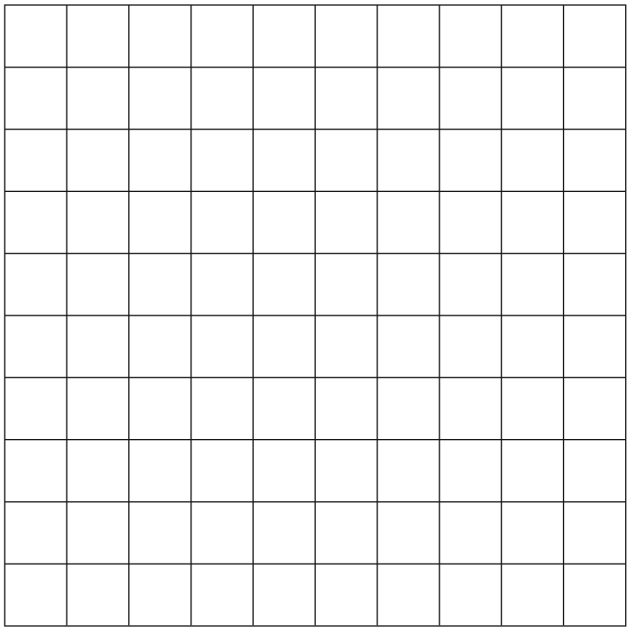


Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student writes an incorrect answer of 26 vans and shows work (*239/9 = 26 R 5*). The student writes an incorrect answer of 5 students are in the last van and shows work by indicating the remainder of the solution.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- **Draw Brianna's garden on the grid.**



= 1 square foot

Brianna has 30 feet of fencing.

- **Will she have enough to completely fence her garden? Show your work or explain your answer.**

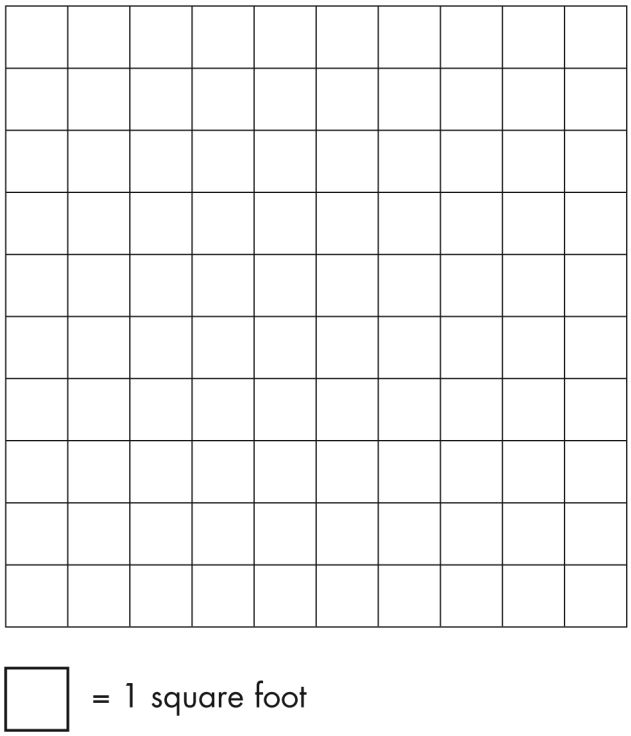
Brianna also wants to cover her entire garden with plastic to control weeds.

- **How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.**

STANDARD 2 – GEOMETRY AND MEASUREMENT

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Sample Solution:

- Draws an 8 by 5 rectangle on the grid
- Yes, 8+8+5+5 = 26 which is less than 30
- 40, $8 \times 5 = 40$

Scoring Rubric

3 Points
The student
- draws a correct 8 by 5 rectangle on the grid
- writes the correct answer that there is enough fencing **and** shows work (26 or 4 extra)
- writes the correct answer of 40 **and** shows work ($8 \times 5 = 40$ or there are 40 squares)

2 Points
The student
- draws a correct 8 by 5 rectangle on the grid
- writes the correct answer that there is enough fencing **and** shows work
- writes the correct answer of 40

OR

- draws a correct 8 by 5 rectangle on the grid
- writes the correct answer that there is enough fencing
- writes the correct answer of 40 **and** shows work

OR

- draws an incorrect rectangle on the grid
- writes the correct answer that there is enough fencing **and** shows work
- writes the correct answer of 40 **and** shows work

OR

- draws an incorrect rectangle on the grid
- provides a perimeter answer based on their error **and** shows work
- provides an area based on their error **and** shows work

1 Point
The student
- draws a correct 8 by 5 rectangle on the grid
- writes the correct answer that there is enough fencing **and** shows work

OR

- draws a correct 8 by 5 rectangle on the grid
- writes the correct answer of 40 **and** shows work

OR

- draws an incorrect rectangle on the grid
- writes the correct answer that there is enough fencing **and** shows work based on the error
- writes the correct answer of 40

OR

- draws an incorrect rectangle on the grid
- provides a perimeter answer based on their error **and** shows work
- provides an area based on their error

OR

- draws an incorrect rectangle on the grid
- provides a perimeter answer based on their error
- provides an area based on their error **and** shows work

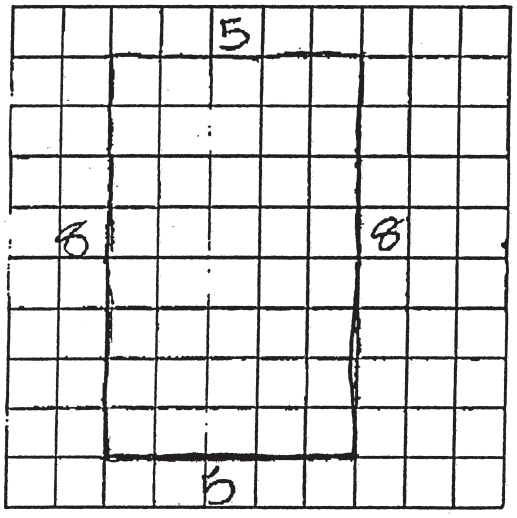
OR

- response shows limited understanding of the problem's mathematical concepts

0 Points
The response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

1. Yes, Brianna will have enough fence to go around her garden because 5+5+8+8=26. And twenty-six is smaller than thirty.

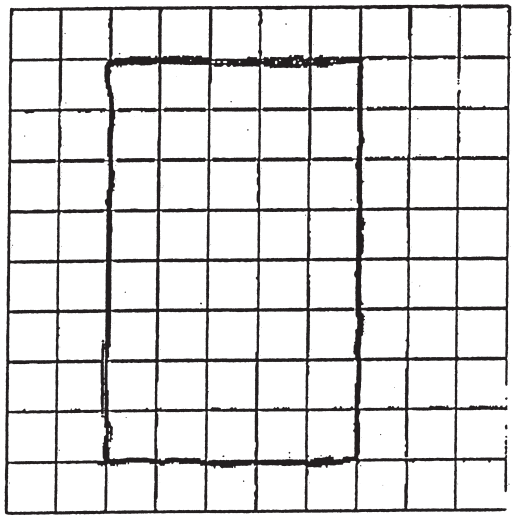
2. Brianna needs 40 sq feet of plastic to cover her garden because 8×5=40.

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student draws a correct 8 × 5 rectangle on the grid. The response contains the correct answer of *Yes, Brianna will have enough fence* and shows supporting work. The response contains the correct answer of *40 sq. feet* and shows supporting work.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



= 1 square foot

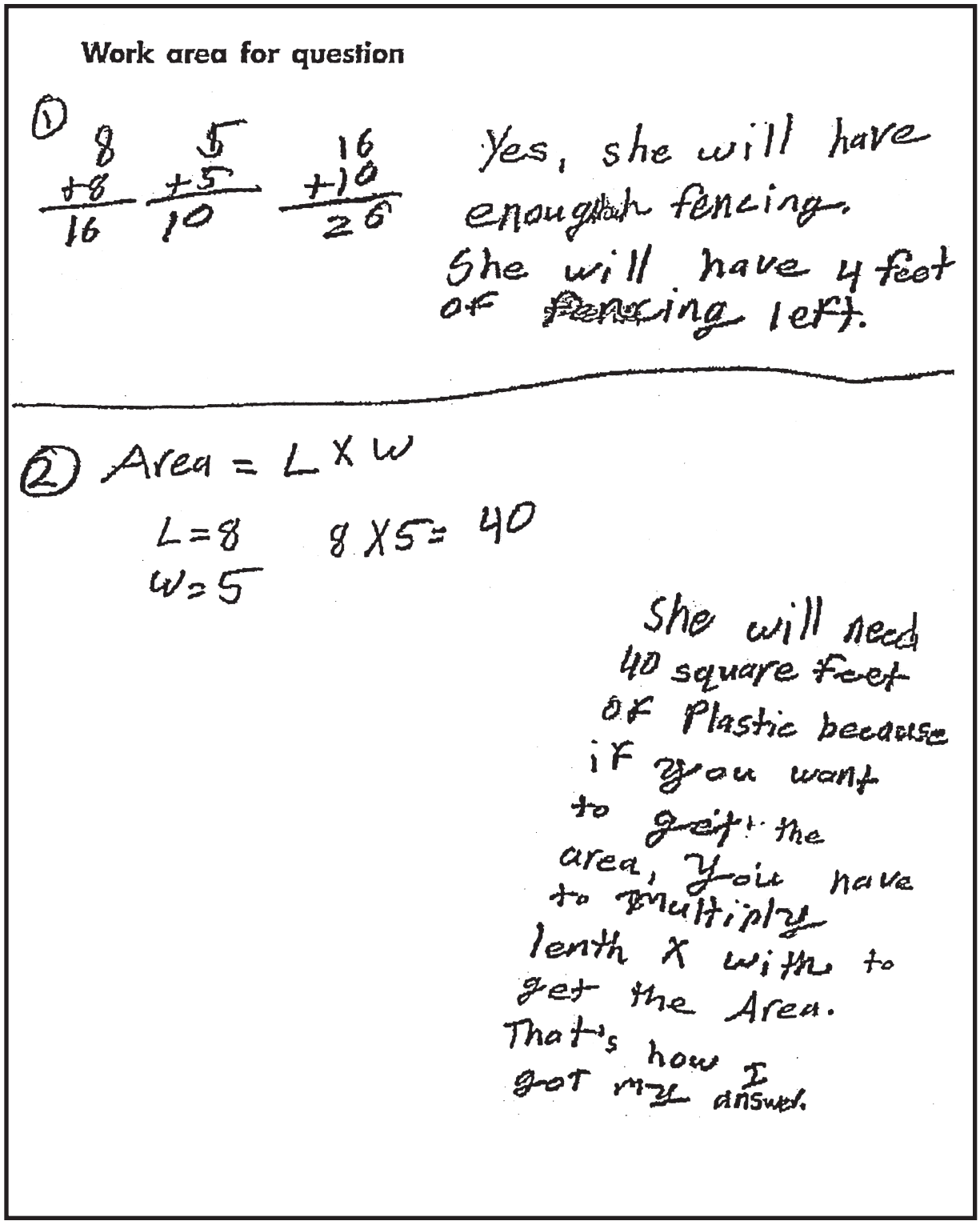
Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

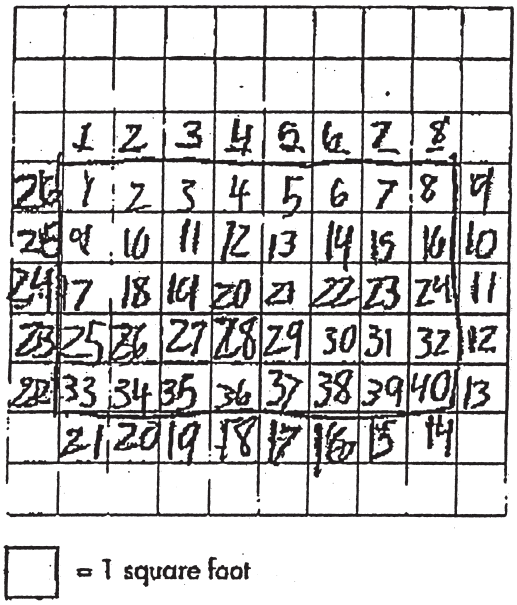


Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student draws a correct 8×5 rectangle on the grid. The response contains the correct answer of *Yes, she will have enough fencing* and shows supporting work. The response contains the correct answer of *40 square feet* and shows supporting work.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

1. Yes, be cause I counted the primeter and saw you onley need 26 feet of fencing.

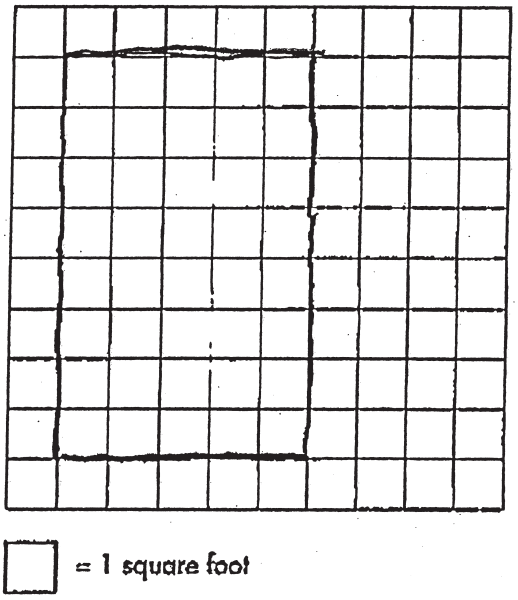
2. she will need 40 feet of plastice.

Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student draws a correct 8 × 5 rectangle on the grid. The response contains the correct answer of *Yes, because I counted the perimeter and saw you onley need 26 feet of fencing.* Work for the perimeter is shown on the grid by the numbering outside the rectangle. The response contains the correct answer of *40 feet of plastic* and shows supporting work by numbering the boxes inside the rectangle. Since labels are not required, the incorrect label of *"feet"* for 40 does not detract from the score.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



Brianna has 30 feet of fencing.

1. • Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

2. • How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

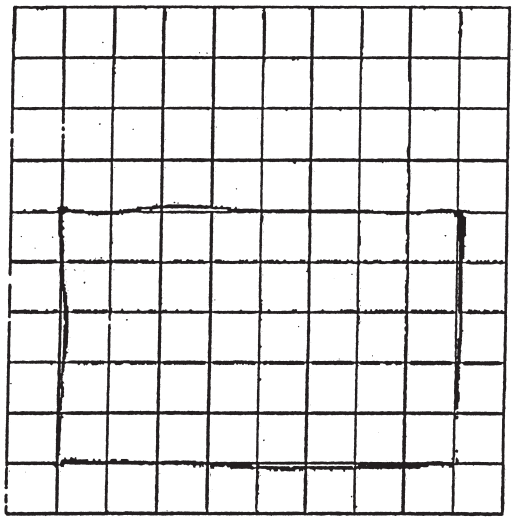
1. Brianna has enough fencing to go around the perimeter of the garden and will have 4 feet of fencing left.

2. Brianna will need 40 square feet of plastic to cover the area of her garden.

Score Point: 2
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student draws a correct 8×5 rectangle on the grid. The response contains the correct answer that *Brianna has enough fencing to go around the perimeter…* and provides support by writing that she *will have 4 feet of fencing left.* The response contains the correct answer of *40 square feet;* however, no supporting work is shown.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



= 1 square foot

Brianna has 30 feet of fencing.

1. • Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

2. • How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

1. Brianna will have enough to completely fence her garden. If you count the outside of her garden, there are 30 squares.

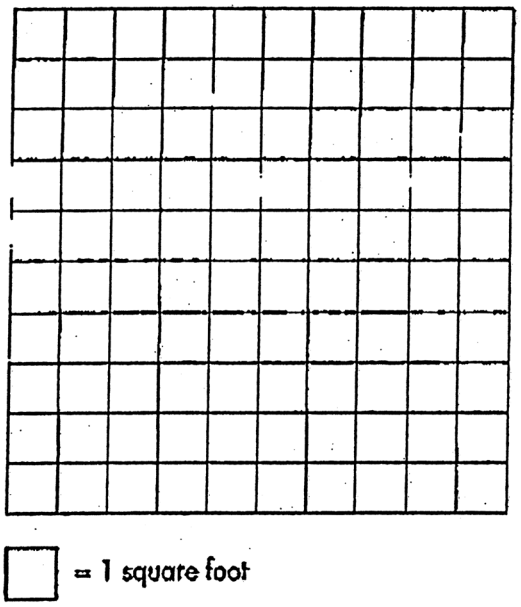
2. Brianna needs 40 feet of plastic. I did 5x8, and that equals 40.

Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student draws a correct 8×5 rectangle on the grid. The response contains the correct answer that *Brianna will have enough to completely fence her garden;* however the supporting explanation is incorrect – *If you count the outside of her garden, there are 30 squares*. The response states the correct answer of *40 feet of plastic* with supporting explanation.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



= 1 square foot

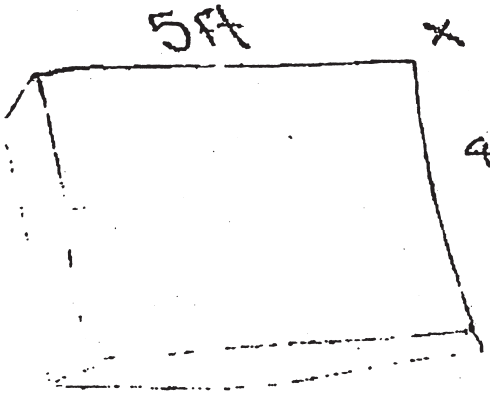
Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question



8+8+5+5=26

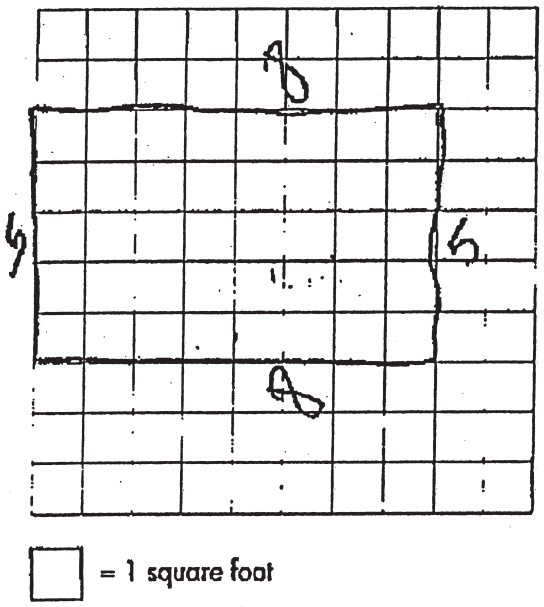
Brianna does have enough fences to completely fence her garden because 8+8+5+5=26
26 < 30

She needs 40 plastic to control weed because 5x8ft=40 square ft.

Score Point: 2
The response shows nearly complete understanding of the problem's essential mathematical concepts. The student does not draw an 8×5 rectangle on the grid. The response contains the correct answer that *Brianna does have enough fences to completely fence her garden* and provides supporting work. The response contains the correct answer of *40 square ft.* with supporting work.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



= 1 square foot

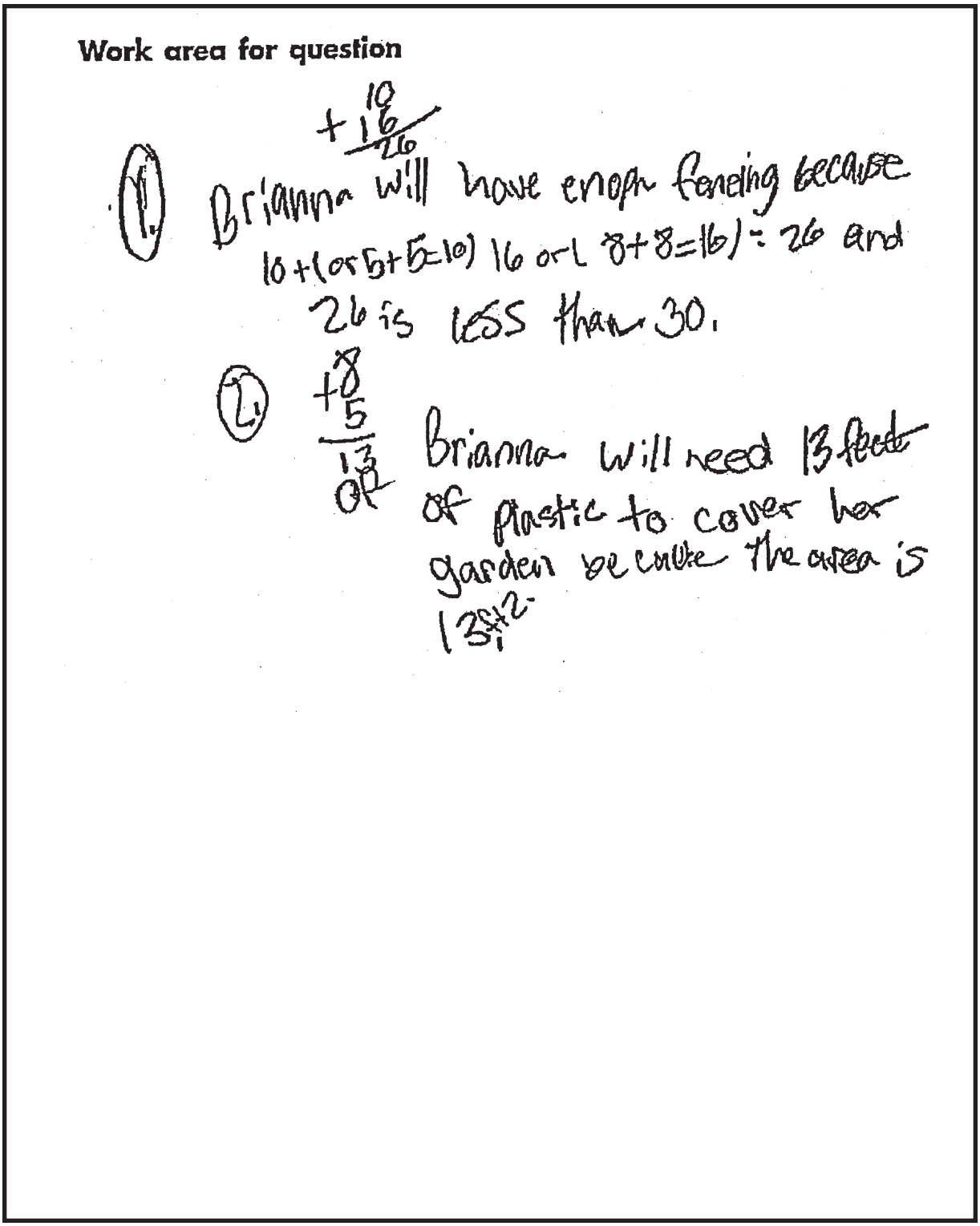
Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

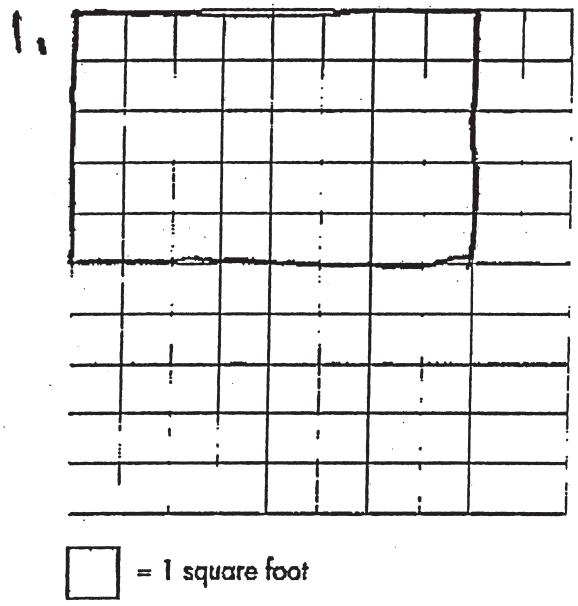


Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student draws a correct 8×5 rectangle on the grid. The response contains the correct answer that *Brianna will have enoph fencing* and provides supporting work. The answer to the last bullet is incorrect.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

1 • Draw Brianna's garden on the grid.

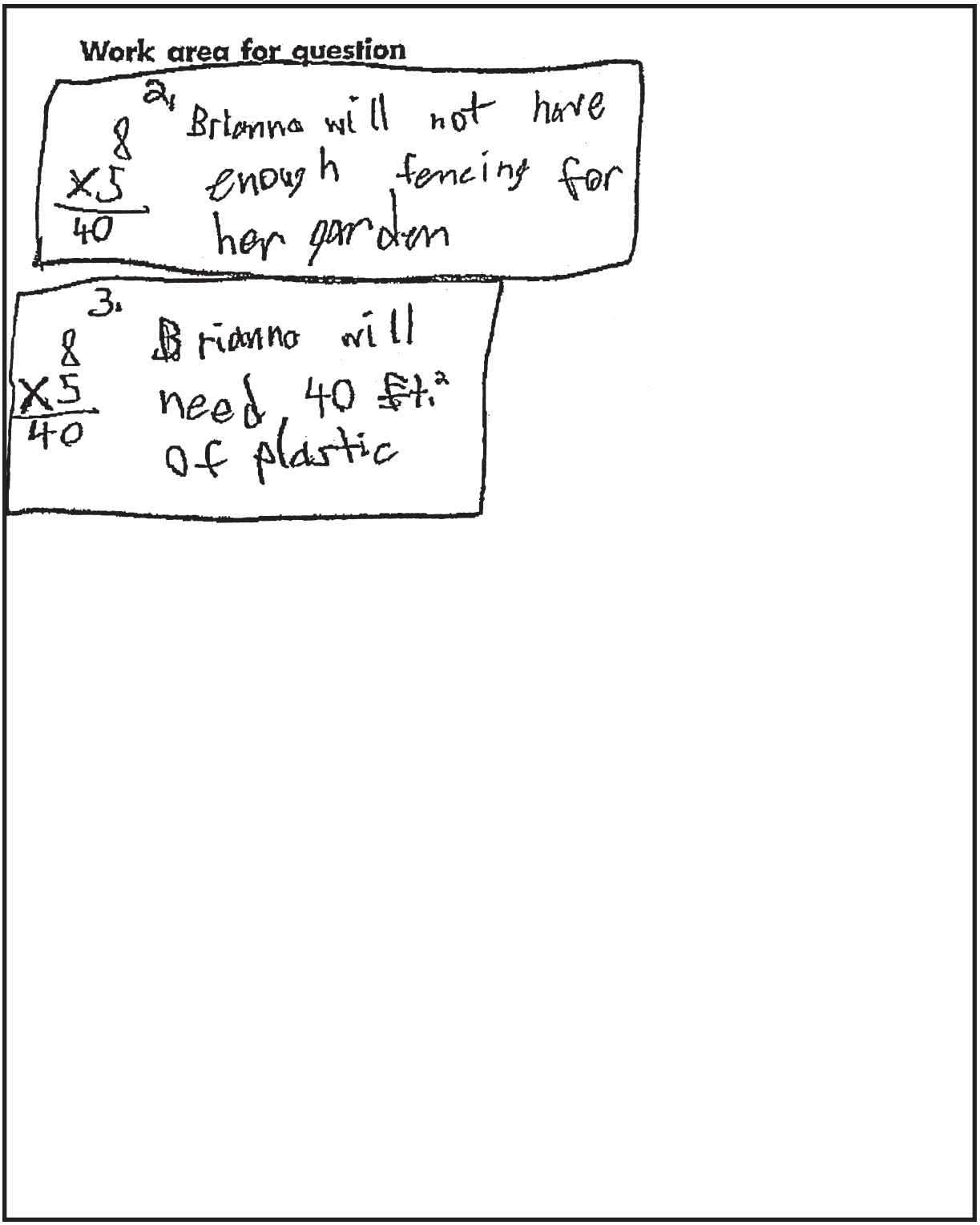


Brianna has 30 feet of fencing.

2 • Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

3 • How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

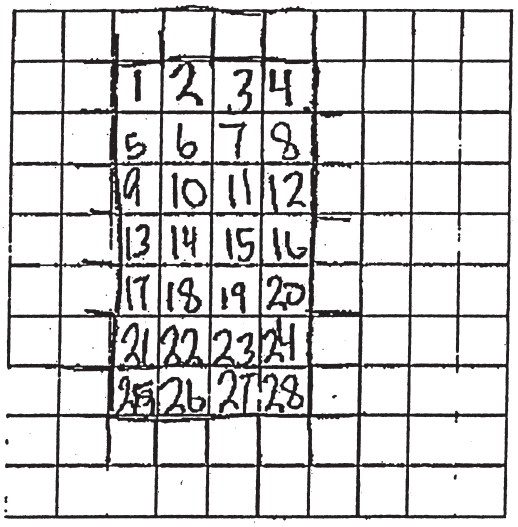


Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student draws a correct 8×5 rectangle on the grid. The response contains the incorrect answer of *Brianna will not have enough fencing for her garden* and shows incorrect work for the perimeter. The student does correctly answer the last bullet with supporting work.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

1. Draw Brianna's garden on the grid.



Brianna has 30 feet of fencing.

2. Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

3. How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

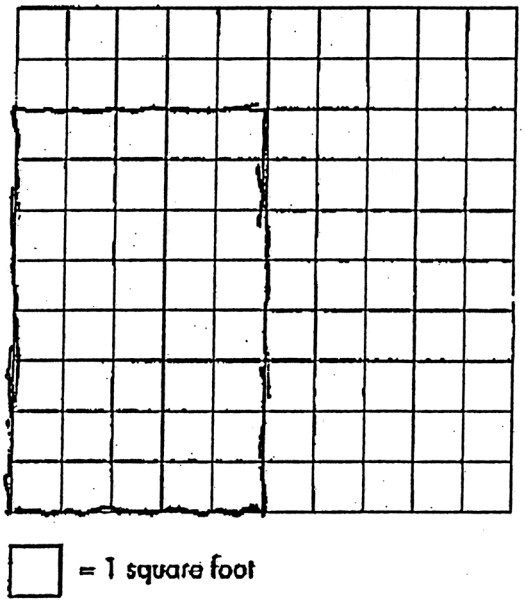
Work area for question

2. Yes
3. Brianna need 28 sq. ft. of plastic to cover her garden

Score Point: 1
The response shows limited understanding of the problem's essential mathematical concepts. The student draws an incorrect rectangle on the grid (4 × 7). The response states the correct answer of *Yes,* to the second bullet; however, no supporting work is given. The response to the third bullet is correct, *Brianna need 28 sq. ft. of plastic to cover her garden,* based upon the incorrect dimensions of the rectangle drawn (4 × 7) and shows supporting work by numbering the boxes inside the rectangle.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



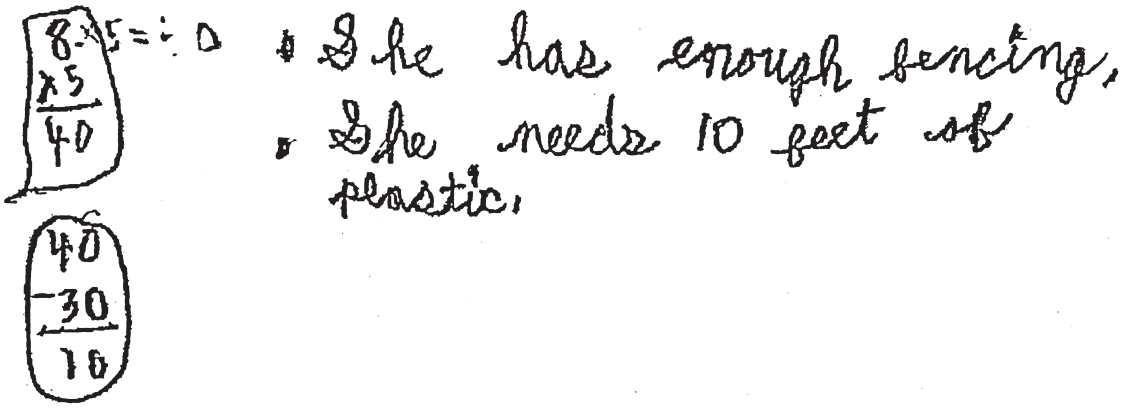
Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

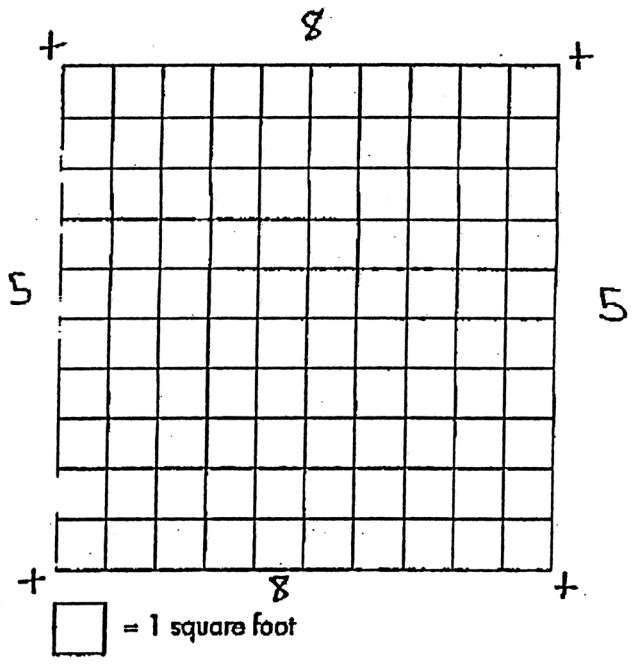


Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student draws a correct 8×5 rectangle on the grid. The answer to the second bullet is correct – *She has enough fencing;* however, no supporting work is provided. The answer to the third bullet is incorrect – *She needs 10 feet of plastic,* with incorrect work.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- **Draw Brianna's garden on the grid.**



8+8+5+5=26

Brianna has 30 feet of fencing.

- **Will she have enough to completely fence her garden? Show your work or explain your answer.**

Brianna also wants to cover her entire garden with plastic to control weeds.

- **How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.**

Work area for question

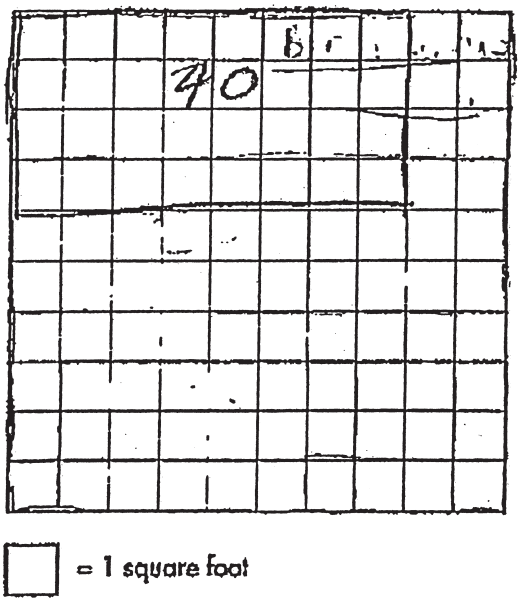
- Yes because 8+8+5+5=26 and she has 30
- She needs 26 because 8+8+5+5=26

Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student does not draw a correct 8×5 rectangle on the grid. The response contains the correct answer of *Yes* to the second bullet and provides supporting work. The response to the third bullet is incorrect.

Brianna is making a rectangular garden. The garden is 8 feet long by 5 feet wide.

- Draw Brianna's garden on the grid.



Brianna has 30 feet of fencing.

- Will she have enough to completely fence her garden? Show your work or explain your answer.

Brianna also wants to cover her entire garden with plastic to control weeds.

- How much plastic does Brianna need to cover her entire garden? Show your work or explain your answer.

Work area for question

#1 Yes, because she only uses 30/100. She only has 70 sq. ft. left.

#2 100 because there are a 100 sq ft.

Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student does not draw a correct 8×5 rectangle, but draws an 8×4 rectangle on the grid. The response contains the correct answer of *Yes* to the second bullet; however, the supporting work is incorrect. The response to the third bullet is incorrect.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question.

STANDARD 3 – PATTERNS AND ALGEBRA

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20^{th} shape on the border?

Sample Solution:

- Triangle, triangle, oval, rectangle, house
- Rectangle, house, triangle, triangle
- house

Scoring Rubric

3 Points
The student

- provides a correct description of the pattern for the border
- draws or writes the correct next four shapes on the border
- draws or writes the correct 20^{th} shape

2 Points
The student

- answers any two of the three bullets correctly

OR

- answers the first two bullets but there is an error in one of them
- answers the third bullet consistent with the error made

1 Point
The student

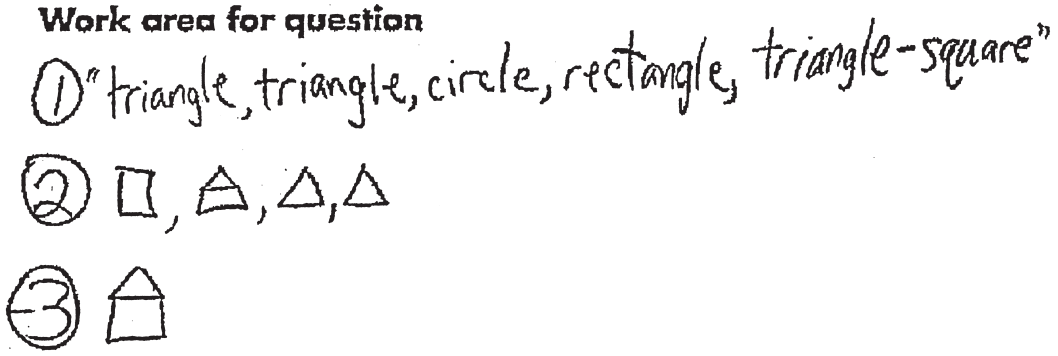
- answers one of the three bullets correctly

0 Points
The response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- **Describe the pattern that is on the wallpaper border.**
- **Draw the next four shapes that would appear on the border.**
- **What would be the 20th shape on the border?**

Work area for question



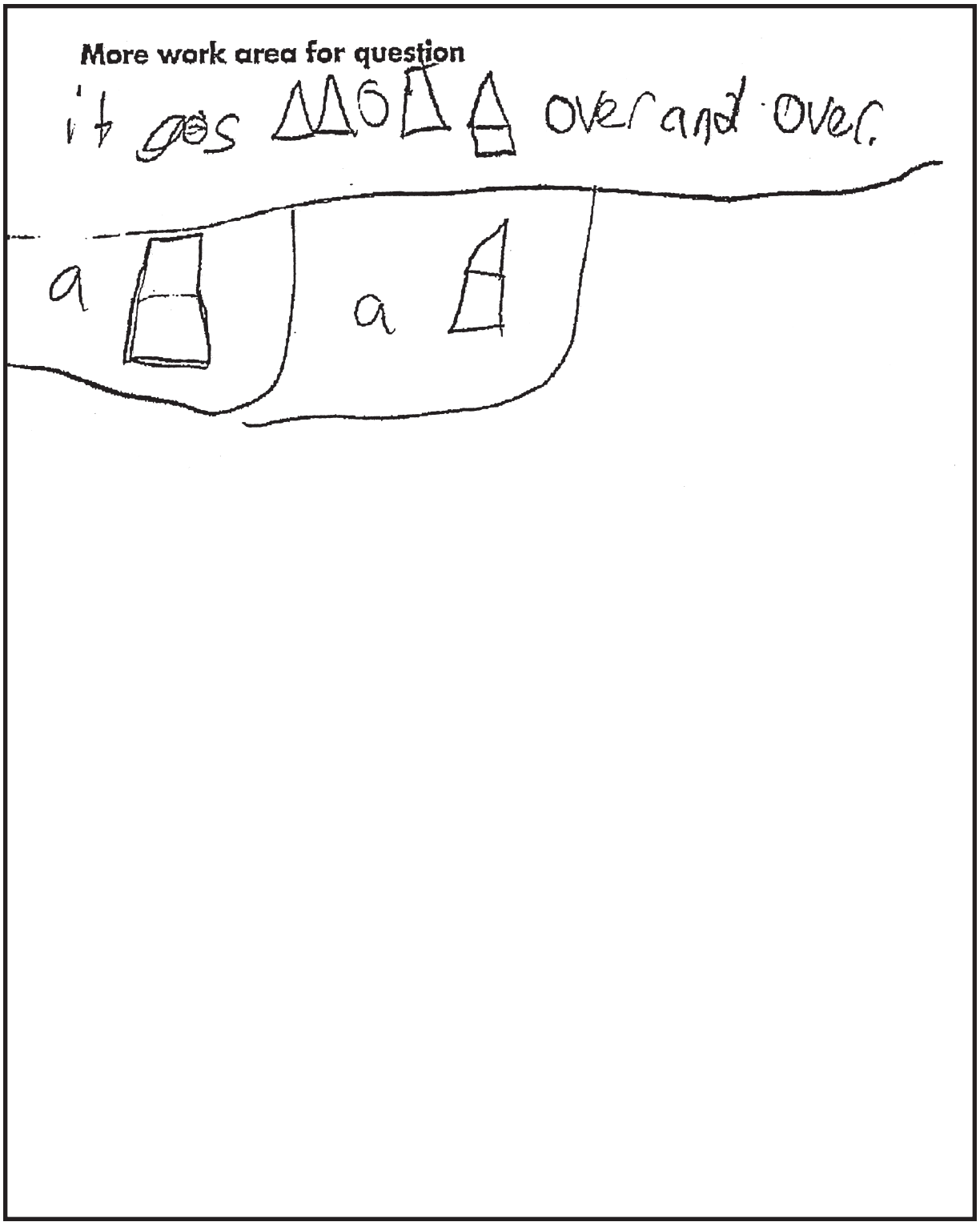
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly describes the pattern – *triangle, triangle, circle* (oval), *rectangle, triangle-square* (house). The correct next four shapes are drawn (rectangle, triangle-square, triangle, triangle). The student draws the correct 20th shape (triangle-square).

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question

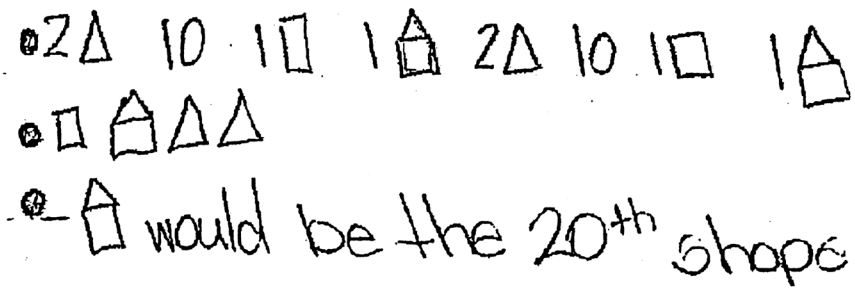


Score Point: 3
The response shows complete understanding of the problem's essential mathematical concepts. The student correctly describes the pattern – *it goes triangle, triangle, oval, rectangle, house over and over.* The correct next four shapes are drawn (rectangle, house, triangle, triangle, oval, rectangle) as an extension on the pattern given. The student draws the correct 20th shape (house) on both pages 1 and 2. It is unclear as to what the rectangle with a line in the middle is and is therefore ignored.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- **Describe the pattern that is on the wallpaper border.**
- **Draw the next four shapes that would appear on the border.**
- **What would be the 20th shape on the border?**

Work area for question



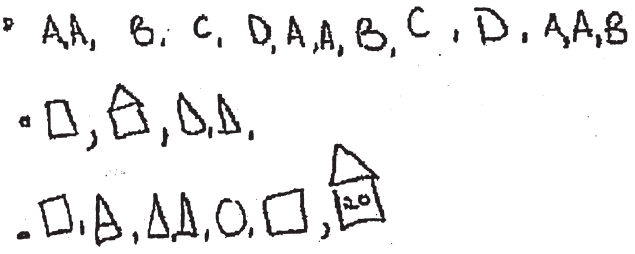
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student correctly describes the pattern – *2 triangles, 1 oval, 1 rectangle, 1 house and then repeats.* The correct next four shapes are drawn (rectangle, house, triangle, triangle). The student draws the correct 20th shape (house).

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question



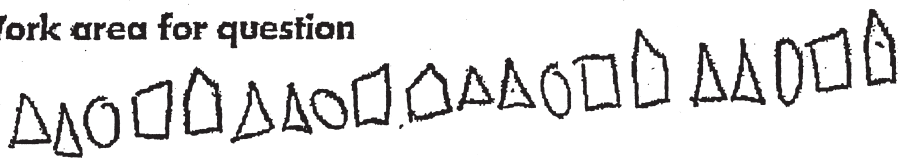
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student uses letters to stand for the shapes and describes the entire prompt border section given (*A, A, B, C, D, A, A, B, C, D, A, A, B*), thus not describing the repeating pattern. The correct next four shapes are drawn correctly (rectangle, house, triangle, triangle). The student continues the pattern and labels the correct 20th shape.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border. Triangle triangle, oval, rectangle, Pentagon
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border? The 20th shape will be the pentagon

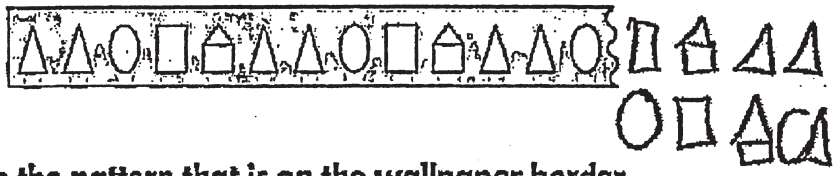
Work area for question



Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student correctly describes the pattern – *triangle, triangle, oval, rectangle, pentagon*. The student gives an incorrect drawing of the next four shapes – *triangle, triangle, oval, rectangle, pentagon*. The student writes the correct 20th shape – *pentagon.*

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.



- **Describe the pattern that is on the wallpaper border.**
- **Draw the next four shapes that would appear on the border.**
- **What would be the 20th shape on the border?**

Work area for question 1

The pattern that is on the wallpaper border is triangle② ovel① square① pentagon② then on and on.

the next four shapes are triangles② ovel① square①

The 20th shape is the triangle.

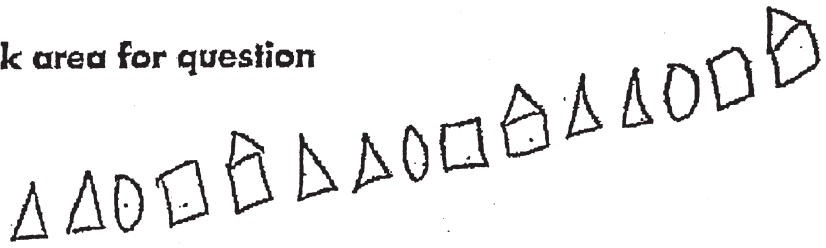
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student correctly describes the pattern – *triangle 2, ovel 1, square 1, pentagon 1, then on and on*. The student draws the correct next four shapes – *square, pentagon, triangle, triangle* – at the top as the continuation of the border and does receive credit for bullet 2. The student writes an incorrect 20th shape – *triangle*.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question



Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student draws the correct repeating of the pattern. This receives credit because it is not just a repeat of the torn prompt border, but the repeating pattern done three times. The drawing of the next four shapes is missing, as well as the correct 20th shape.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question

1. A, A, B, C, D, A, A, B, C, D, A, A, B

2. □

3. ⌂

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student uses letters to stand for the shapes and describes the entire prompt border section given (*A, A, B, C, D, A, A, B, C, D, A, A, B*), thus not describing the repeating pattern. Only the correct first shape is given (rectangle) for the next four shapes. The student draws the correct 20th shape.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question

- The pattern goes on and on
- □⌂△△○
- The rectangle and the house.

Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student does not correctly describe the pattern (*the pattern goes on and on*). The student draws the correct next four shapes – *rectangle, house, triangle, triangle, oval*. Even though 5 are drawn, it does not detract from the score. The student writes *the rectangle and the house* as the 20th shape, which is incorrect.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- **Describe the pattern that is on the wallpaper border.**
- **Draw the next four shapes that would appear on the border.**
- **What would be the 20th shape on the border?**

Work area for question

- It has 6 triangles, 3 circles, 2 rectangle, and 2 pentagons the are upset down.
- □ △ △ ○
- a circle ○.

Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student incorrectly describes the pattern – *it has 6 triangles, 3 circles, 2 rectangles, and 2 pentagons* . . . and does not describe the repeating pattern. The next four shapes are incorrect – *rectangle, triangle, triangle, circle.* An incorrect answer for the 20th shape is given – *a circle*.

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question

More work area for question

The pattern is tringle, circle, square and a house. The 20th shape will be a tringle

Score Point: 0

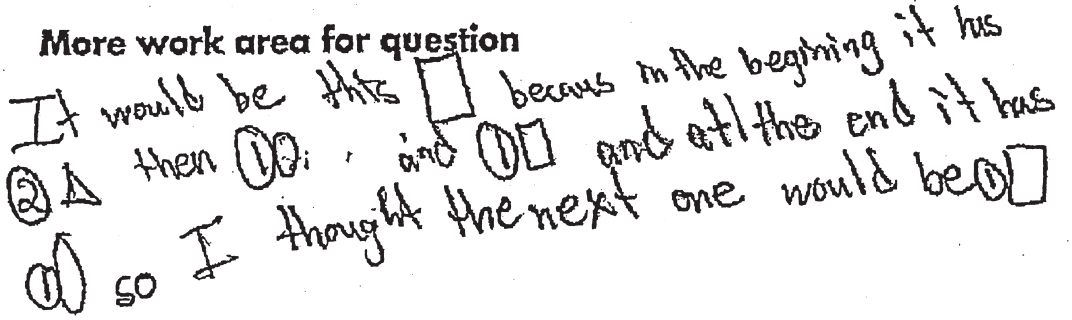
The response shows insufficient understanding of the problem's essential mathematical concepts. The student incorrectly describes the pattern – *triangle, circle, square, and a house* – leaving out the first triangle. The next four shapes are incorrect – *rectangle, triangle, triangle, oval*. An incorrect answer for the 20th shape is given – *triangle* (triangle).

Kendra was pasting a wallpaper border on her bedroom wall. The border has a pattern on it. The border tore after the 13th shape.

- Describe the pattern that is on the wallpaper border.
- Draw the next four shapes that would appear on the border.
- What would be the 20th shape on the border?

Work area for question

More work area for question



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student seems to be answering the question of "What is the next shape in the pattern and give a reason for your answer." The student writes – *It would be this rectangle because in the beginning it has 2 triangles then 1 oval and 1 rectangle and at the end it has 1 oval so I thought the next one would be 1 rectangle*. Even though the student gives the first four shapes of the pattern, it is clear that the student has not correctly addressed the questions given.

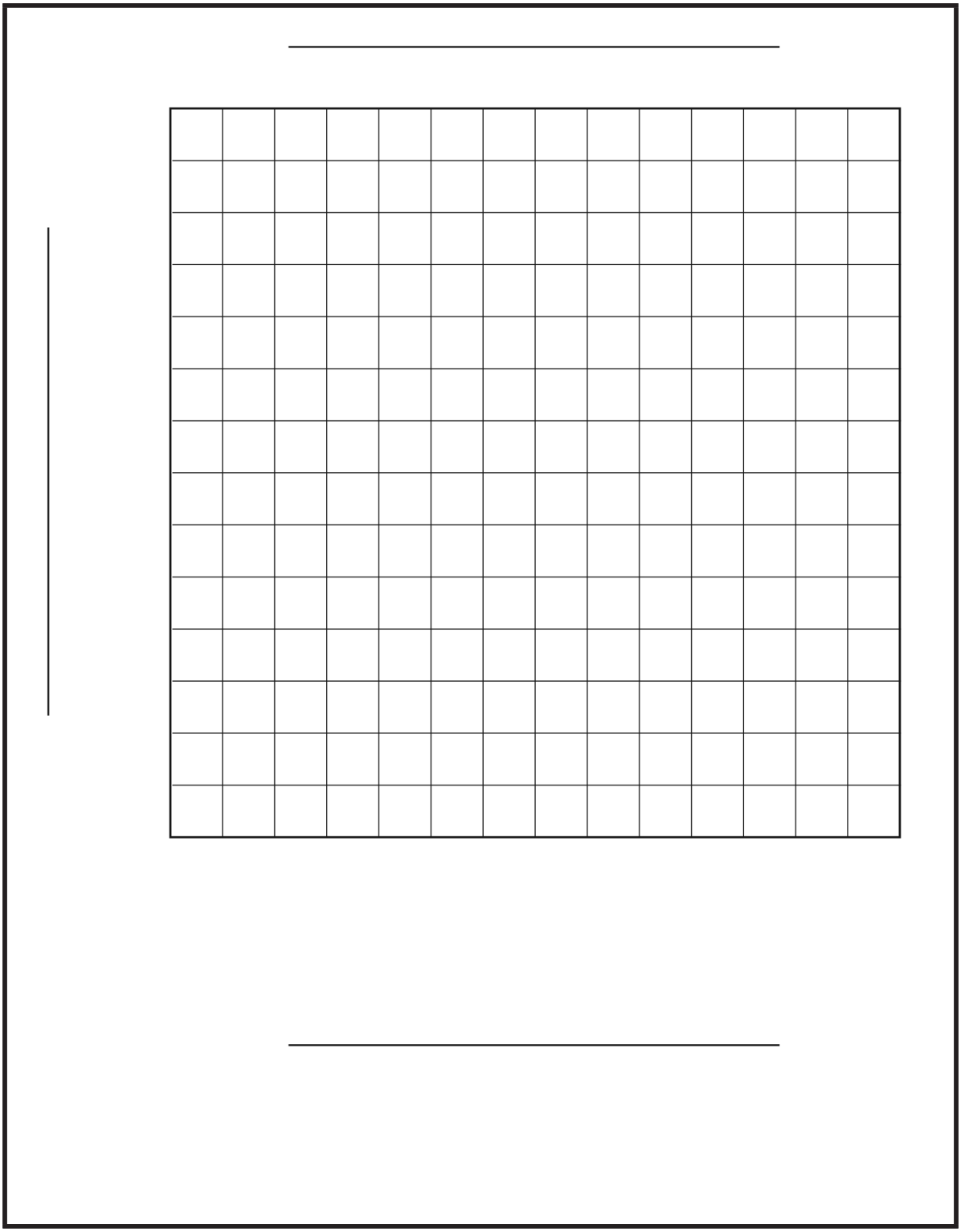
Mrs. Bently's class took a trip to the zoo. The students counted and recorded the number of animals in each exhibit. The table below shows their results.

Animals at the Zoo

Animal	Number of Animals
Cats	12
Bears	8
Reptiles	14
Elephants	7
Seals	9

Using the grid on the next page, construct a bar graph to represent the students' findings. Be sure to label all parts of your graph and give your graph a title.

Work area for question.



STANDARD 4 – DATA ANALYSIS, PROBABILITY, AND DISCRETE MATHEMATICS

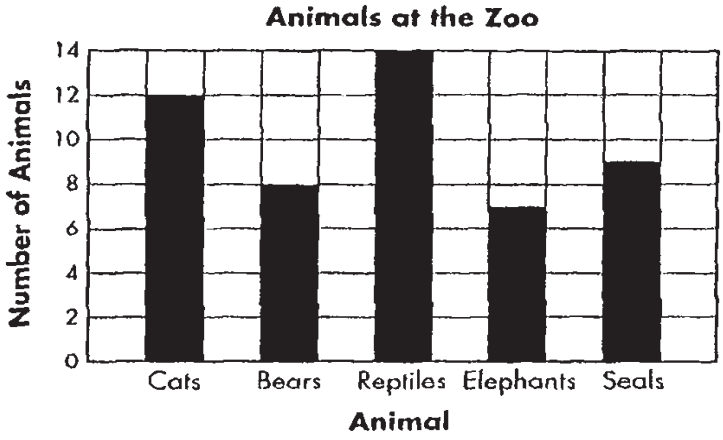
Mrs. Bently's class took a trip to the zoo. The students counted and recorded the number of animals in each exhibit. The table below shows their results.

Animals at the Zoo

Animal	Number of Animals
Cats	12
Bears	8
Reptiles	14
Elephants	7
Seals	9

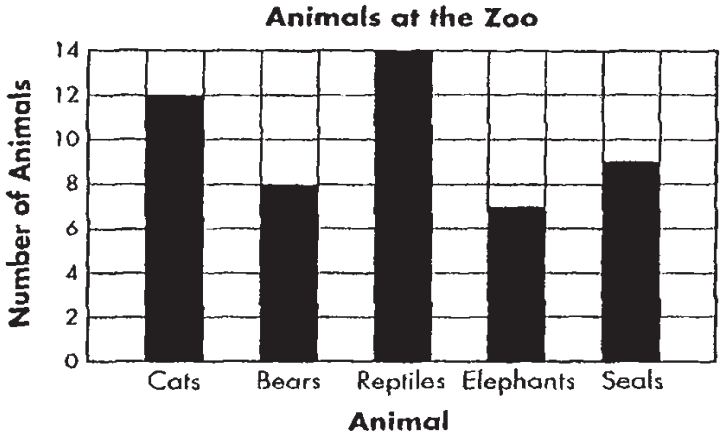
Using the grid on the next page, construct a bar graph to represent the students' findings. Be sure to label all parts of your graph and give your graph a title.

Sample Solution:



Scoring Rubric

3 Points
The student
- represents at least 4 of the data given in a bar graph correctly
- provides a consistent scale
- titles the graph
- labels the axes



2 Points
The student
- represents at least 4 of the data given in a bar graph correctly
- provides an incorrect scale or scale is missing
- titles the graph
- labels the axes

OR

- represents at least 4 of the data given in a bar graph correctly
- provides a consistent scale
- does not provide a title
- labels the axes

OR

- represents at least 4 of the data given in a bar graph correctly
- provides a consistent scale
- titles the graph
- does not label one or both axes

OR

- represents at least 3 of the data in a bar graph correctly but the error is due to a bad estimation of their consistent scale
- titles the graph
- labels the axes

1 Point

The student

- represents at least 4 of the data given in a bar graph correctly
- provides a consistent scale
- does not provide a title
- does not label one or both axes

OR

- represents at least 4 of the data given in a bar graph correctly
- provides an incorrect scale or scale is missing
- does not title the graph
- labels the axes

OR

- represents at least 4 of the data given in a bar graph correctly
- provides an incorrect scale or scale is missing
- titles the graph
- does not label the axes

OR

- response shows limited understanding of the problem's mathematical concepts

OR

- represents 2 of the data in a bar graph correctly but the error is due to a bad estimation of their consistent scale
- titles the graph
- labels the axes

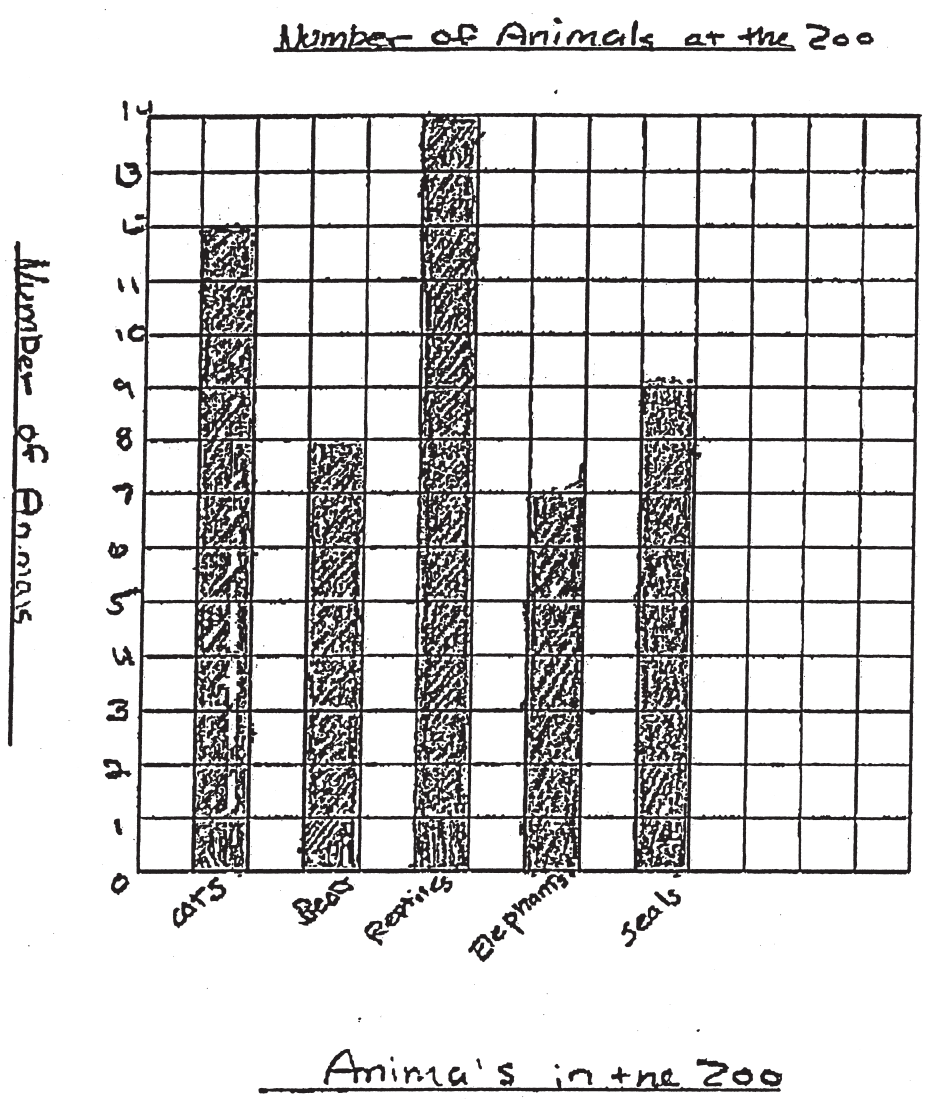
0 Points

The student

- represents the data given in a graph (may be other than a bar graph) but the work may be partially complete or incorrect due to the misreading of the data

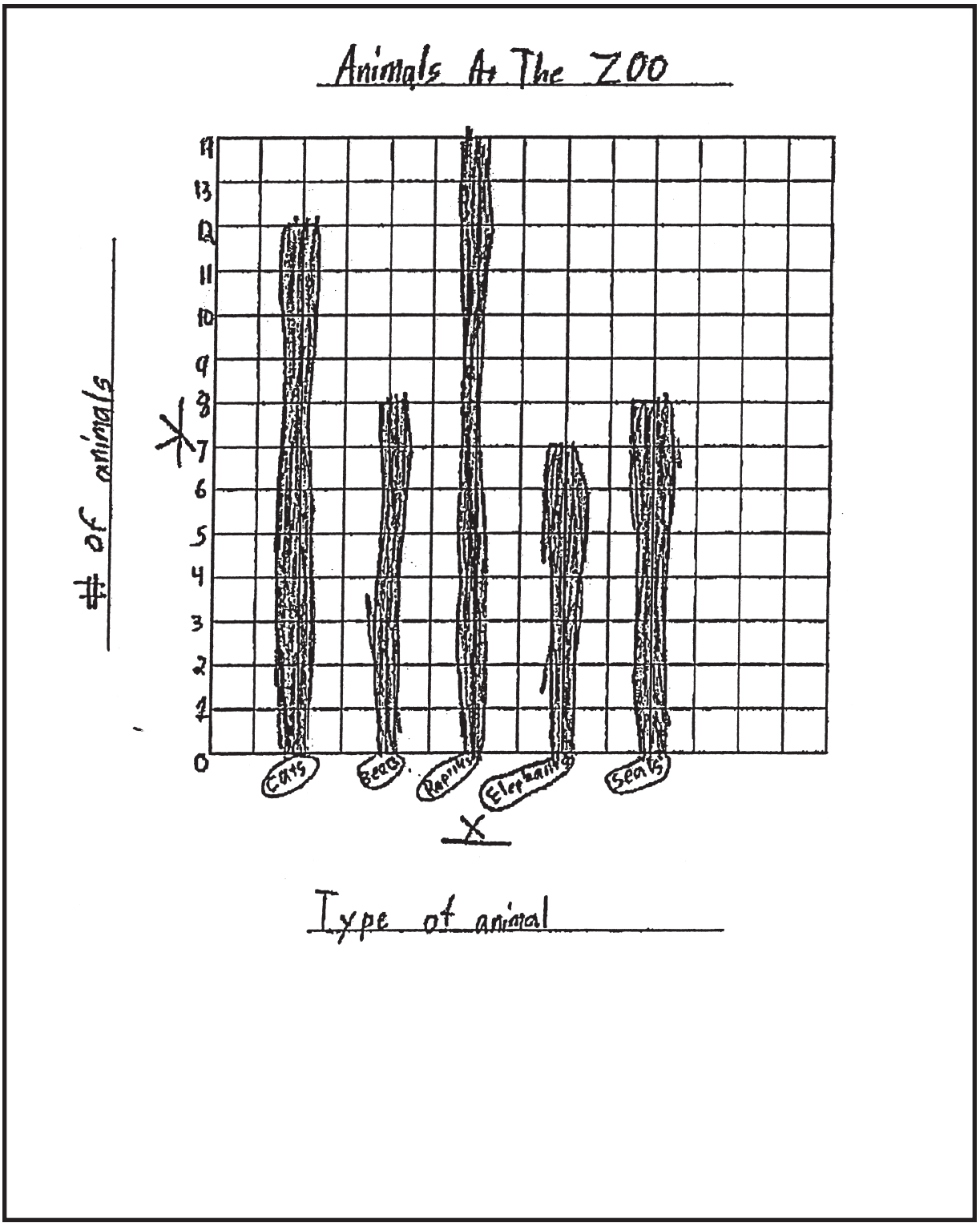
OR

- the response shows insufficient understanding of the problem's mathematical concepts. The response is incomplete or inaccurate and contains major errors, or no response is given



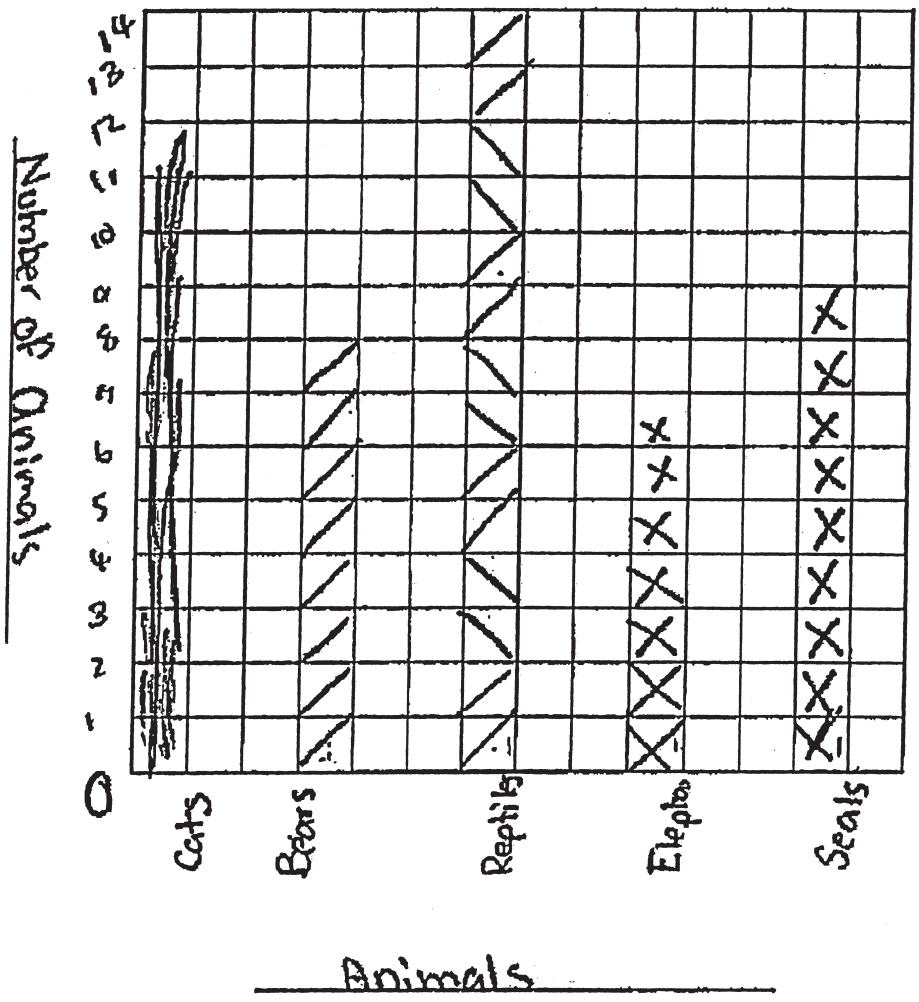
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, provides a consistent scale, correctly titles the graph and labels the axes.



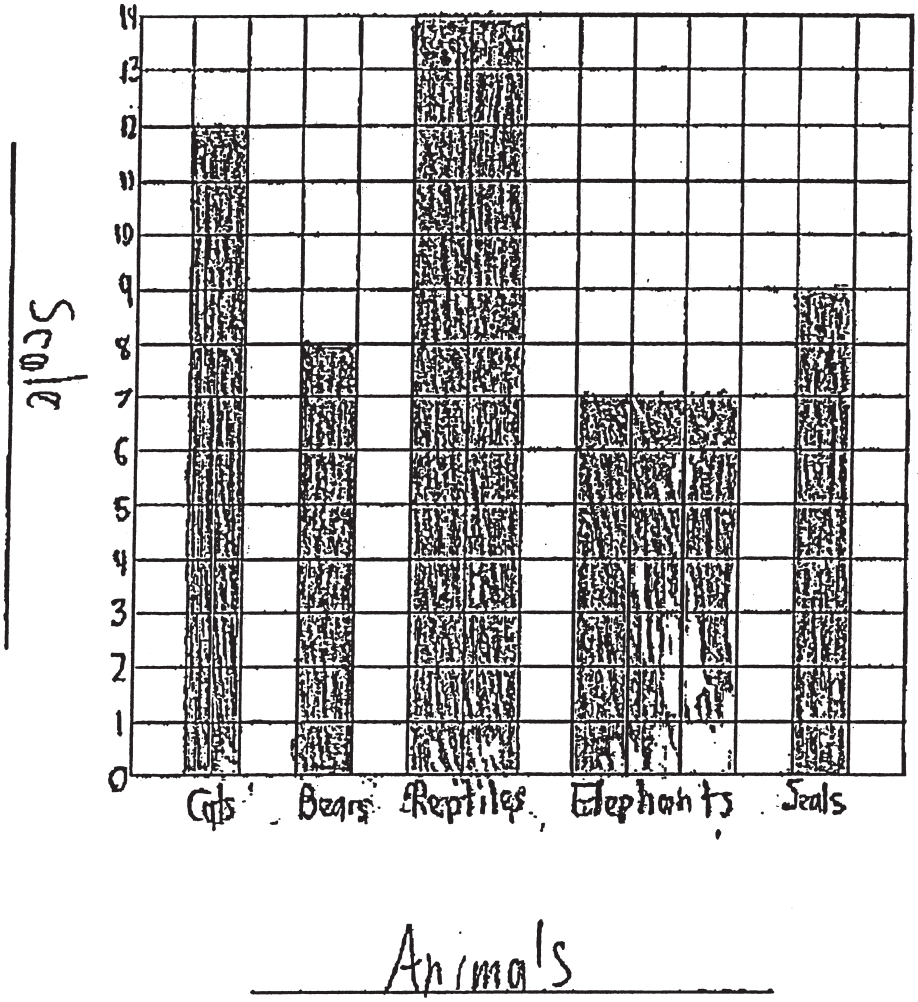
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, provides a consistent scale, correctly titles the graph and labels the axes.



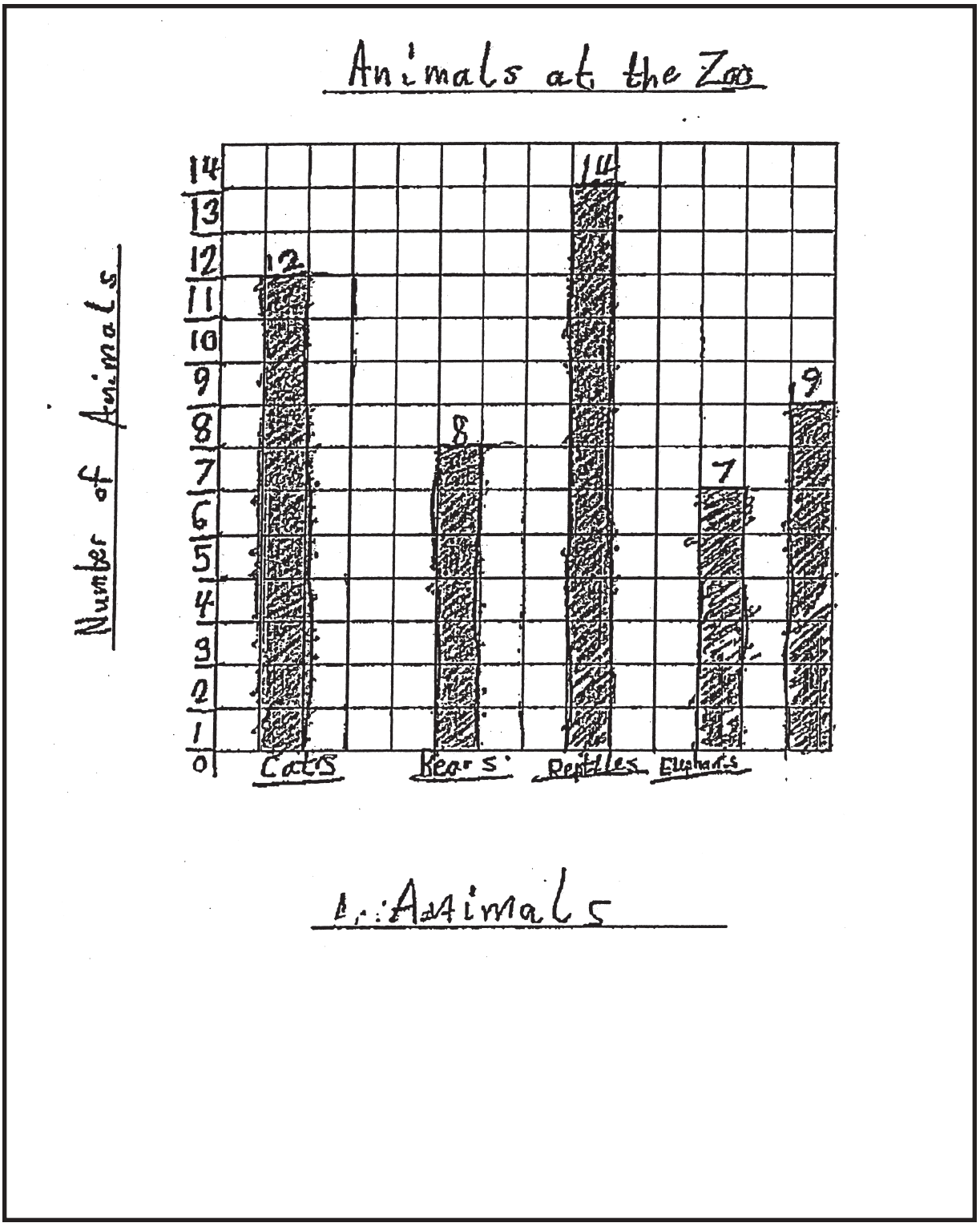
Score Point: 3

The response shows complete understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, provides a consistent scale, correctly titles the graph and labels the axes.



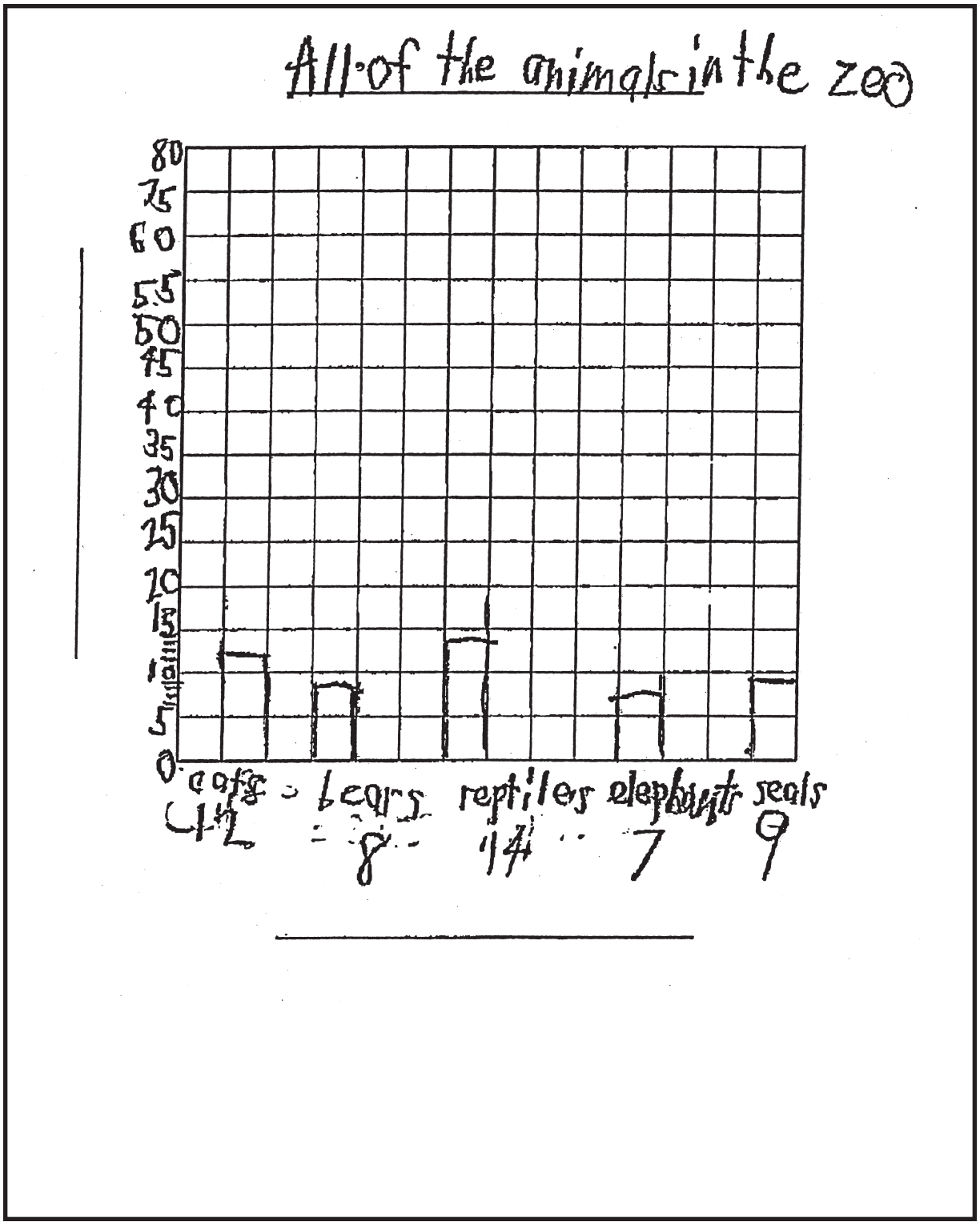
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, provides a consistent scale, correctly titles the graph, labels the x-axis but incorrectly labels the y-axis (*scale*).



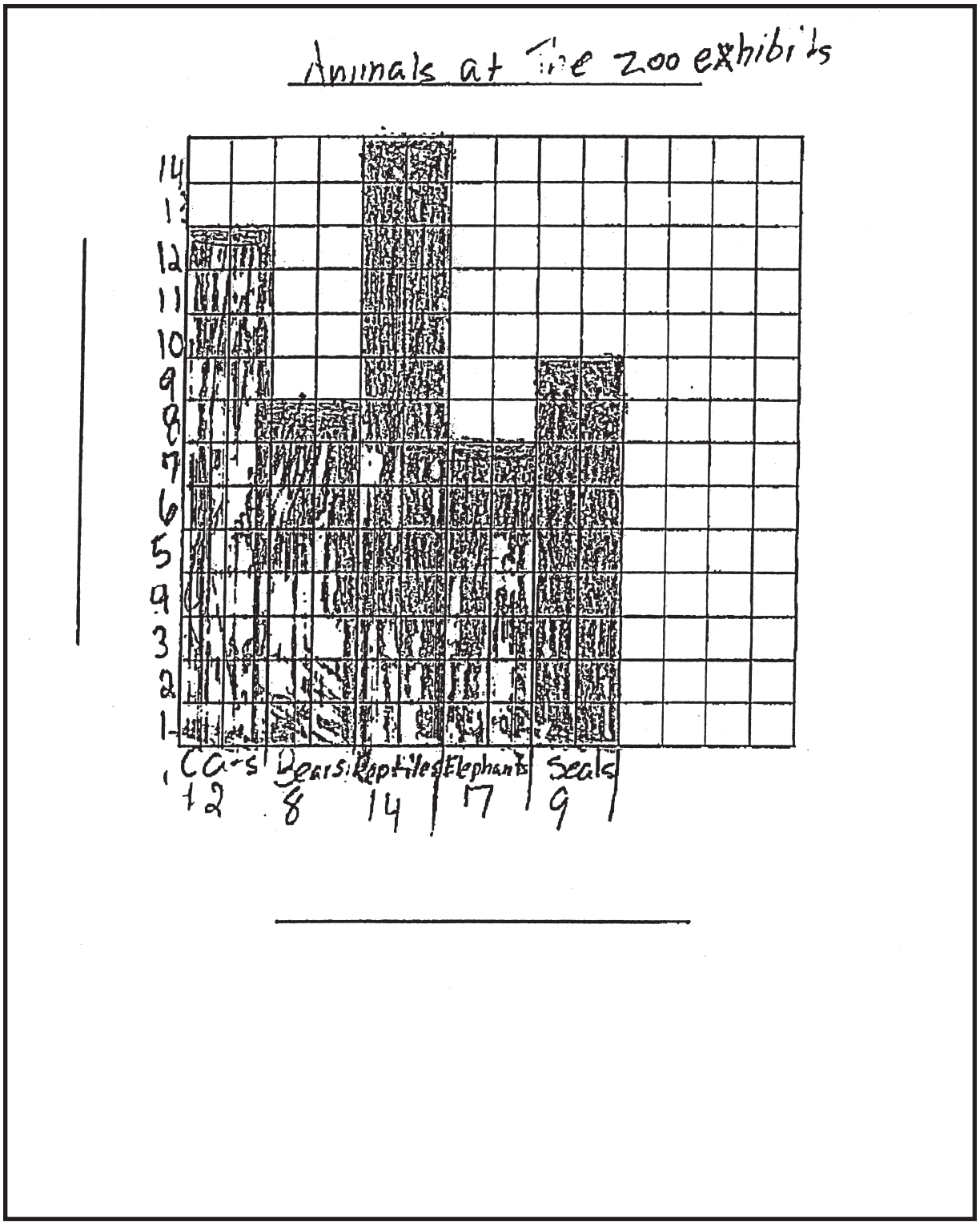
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, but provides an incorrect scale (labels the spaces instead of the lines), correctly titles the graph and labels the axes.



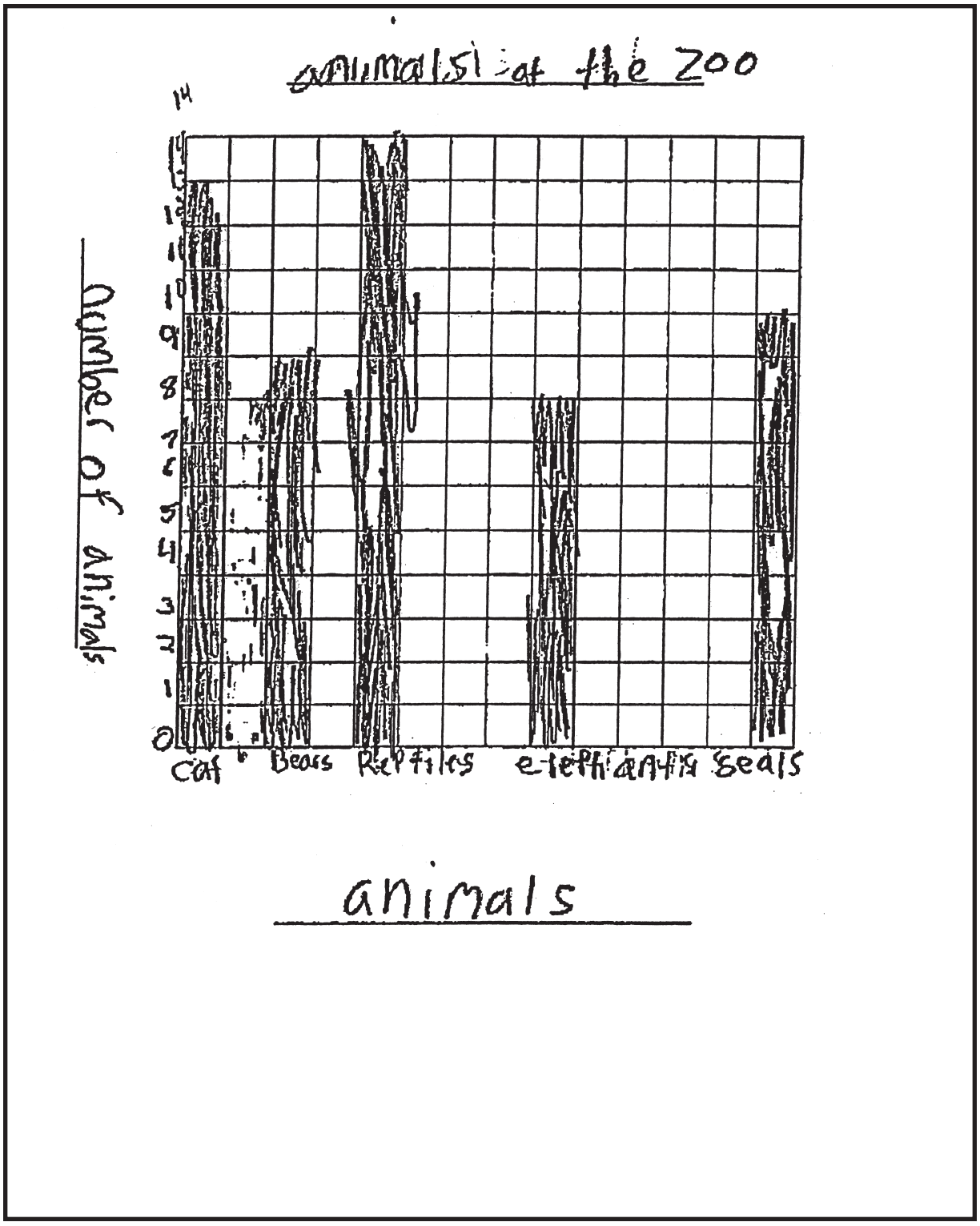
Score Point: 2

The response shows nearly complete understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, provides a consistent scale, correctly titles the graph but does not label the axes.

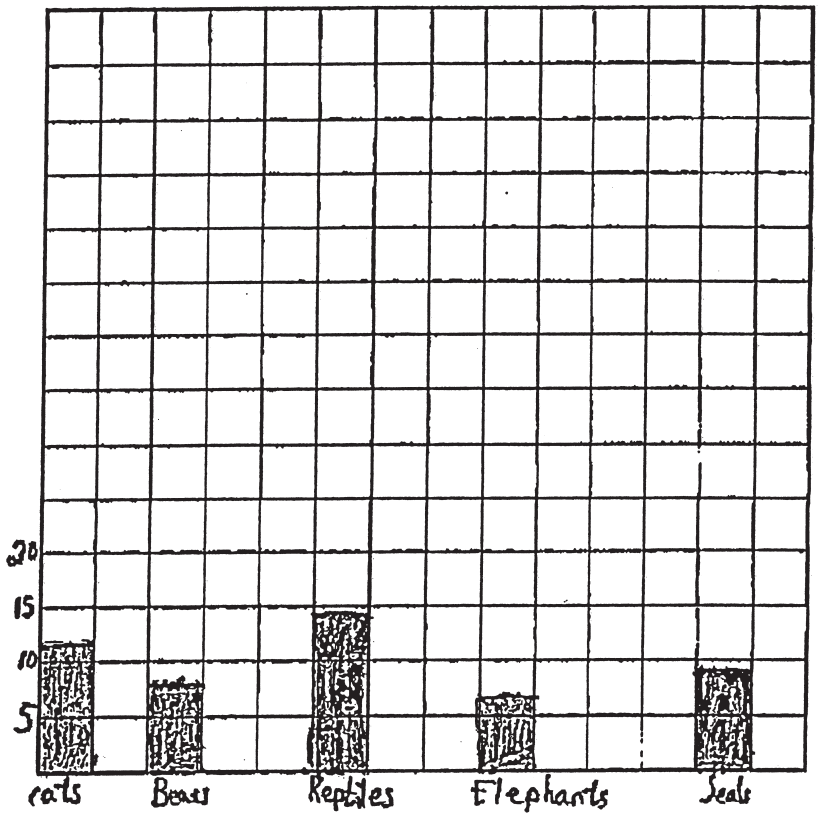


Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, but provides an incorrect scale (labels the spaces instead of the lines). The student correctly titles the graph but does not label the axes.

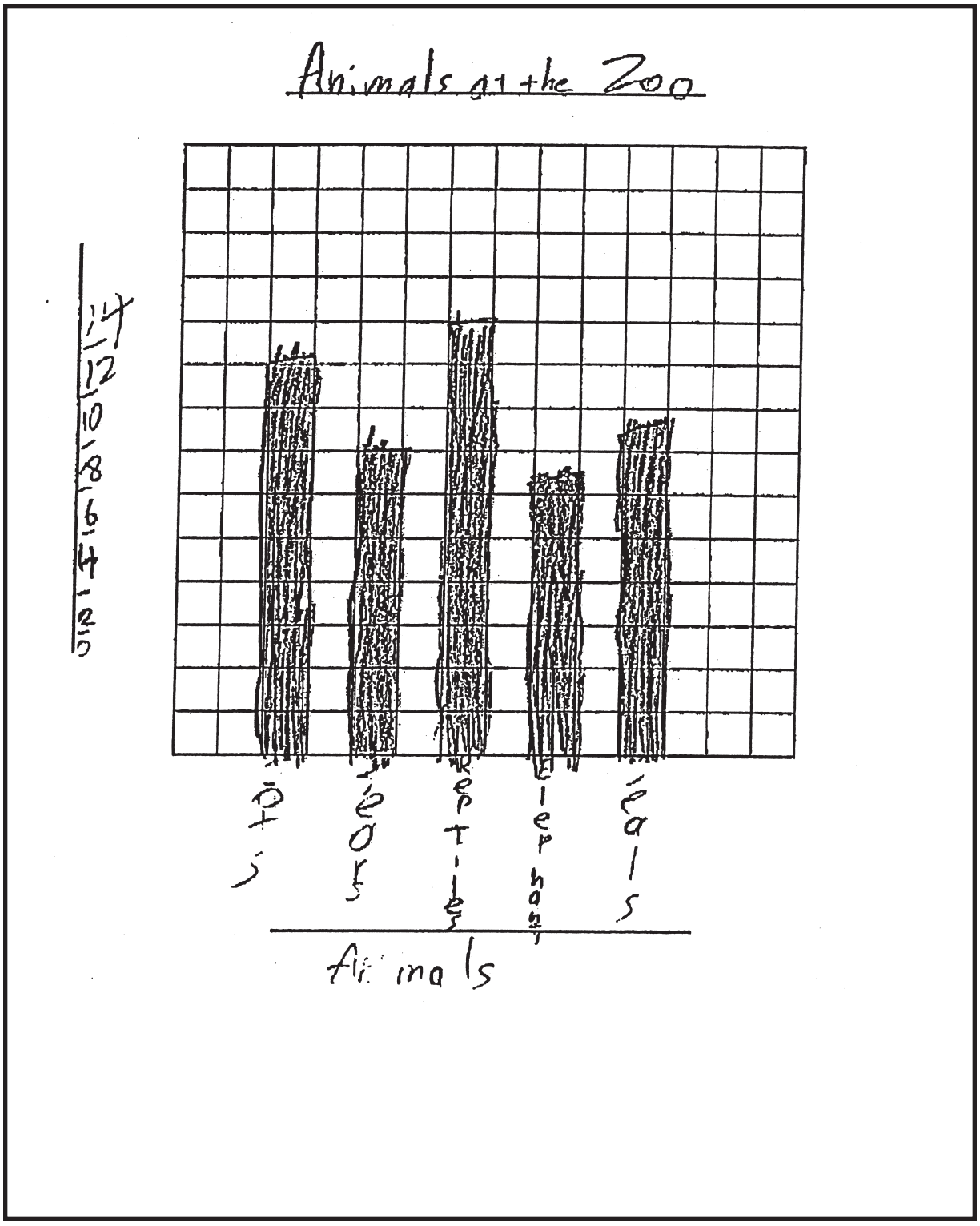


Score Point: 1
The response shows limited understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, but provides an incorrect scale (labels the spaces instead of the lines) and places the zero above the origin, which causes the data to be graphed below zero. The student correctly titles the graph and labels the axes.



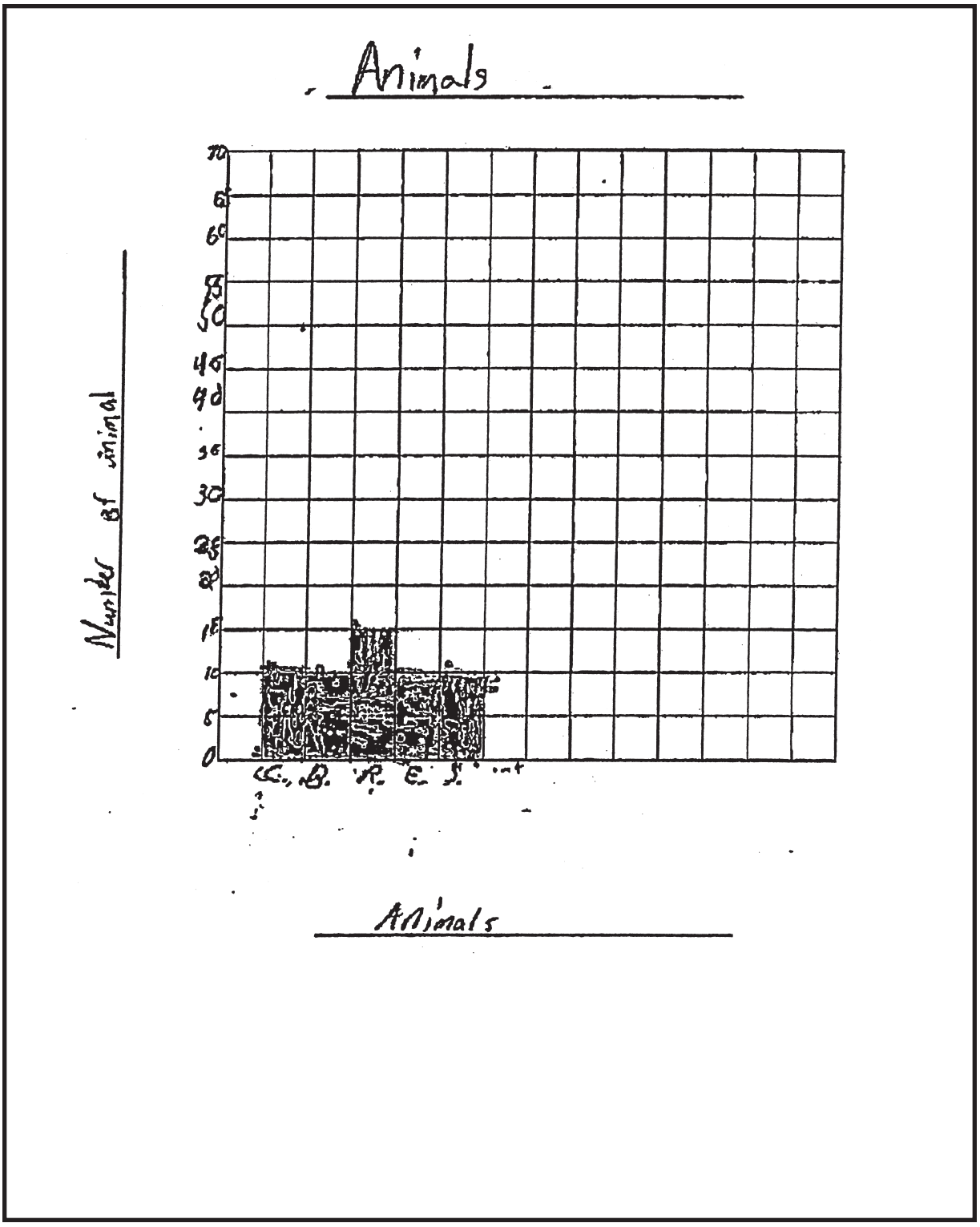
Score Point: 1

The response shows limited understanding of the problem's essential mathematical concepts. The student represents at least 4 of the data in a bar graph correctly, and provides a consistent scale. The graph has no title or axes labels.



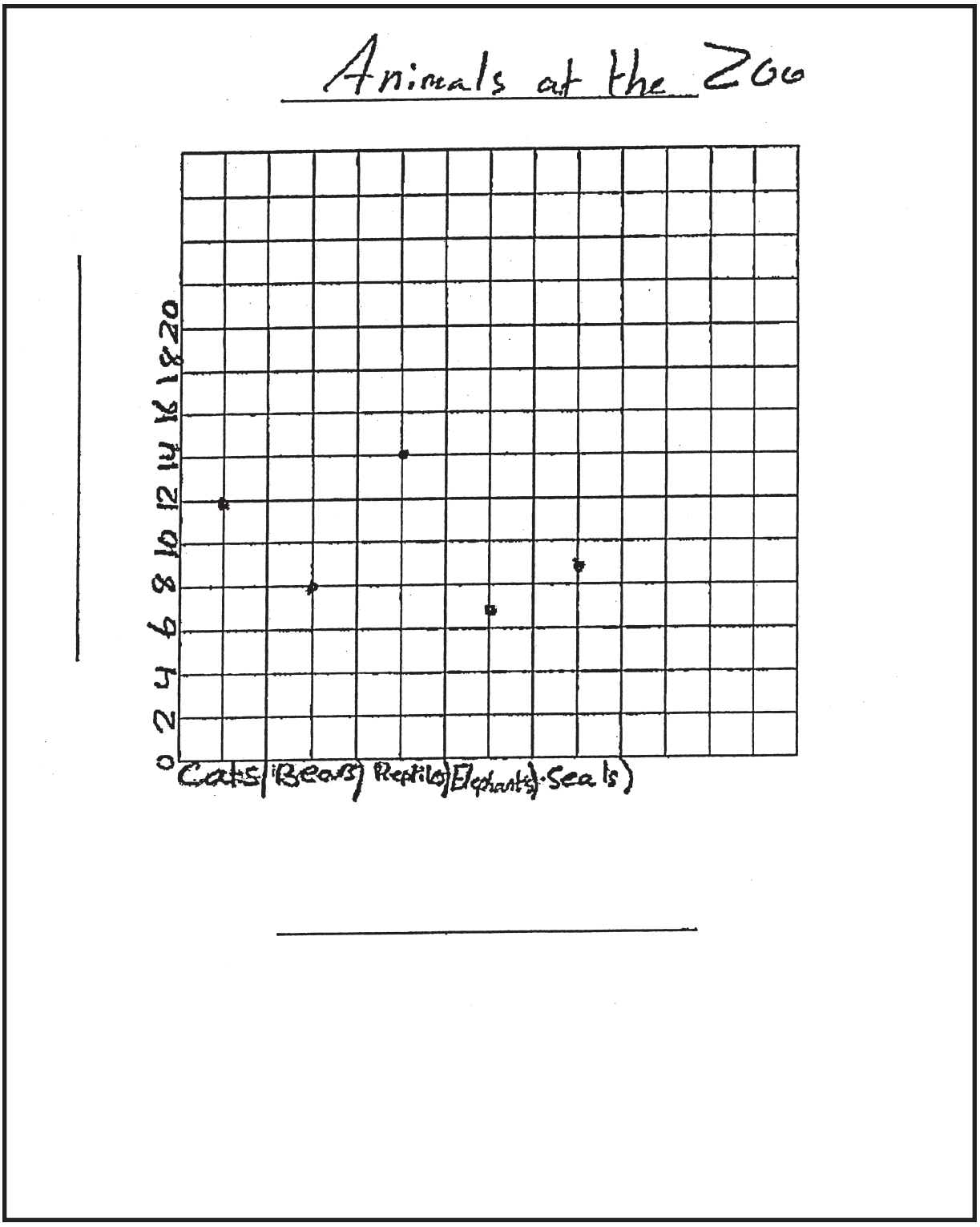
Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student represents the data incorrectly in a bar graph and provides an incorrect scale (one that is "floating" and not anchored on the axes). In this case the graph is treated as one without a scale. The student correctly titles the graph and labels only one of the axes.



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student represents the data incorrectly in a bar graph, but provides a consistent scale. The student correctly provides axes labels but an incorrect title.



Score Point: 0

The response shows insufficient understanding of the problem's essential mathematical concepts. The student represents the data in a form other than a bar graph. The student does provide a consistent scale and a correct title. The axes labels are missing.

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